www.freeservicemanuals.info

TAPE PATH ADJUSTMENT GUIDE

March, 1984

LIST OF CHASSIS TYPES

NTSC SYSTEM			
C TYPE	710 TYPE	711 TYPE	
SL-5400	SL-5000	SL-2000	SL-2406
SL-5600	SL-5010	SL-2001	SL-2408C
SL-5800	SL-5020	SL-2005	SL-2410
	SL-5100	SL-2300	SL-2415
	SL-5100E	SL-2305	SL-2500
	SL-5101	SL-2400	SL-2700
	SL-5200	SL-2400C	SL-2700B
		SL-2401	SL-2710
		SL2405	SL-2710B
		SL-2405C	

CCIR SYSTEM			
C TYPE	710 TYPE	711 TYPE	
SL-5400MD	SL-5000MD	SL-C9AS	SL-C40UB
SL-C5AS	SL-C6AS	SL-C9E	SL-C44PS
SL-C5CH	SL-C6E	SL-C9ES	SL-C80AS
SL-C5E	SL-C6EC	SL-C9ECS	SL-C80E
SL-C5EC	SL-C6EI	SL-C9F	SL-C80SA
SL-C5EI	SL-C6ES	SL-C9UB	SL-C88EC
SL-C5SA	SL-C6F	SL-C20E	SL-F1E
SL-C5UB	SL-C6SA	SL-C20UB	SL-F1F
SL-C7E	SL-C6UB	SL-C24PS	SL-F1UB
SL-C7EC	SL-C6UB MKII	SL-C30E	SL-T20ME
SL-C7EI	SL-C8SA	SL-C30HK	SL-T30ME
SL-C7F	SL-T6ME	SL-C30PS	SL-T50ME
SL-C7SA	SL-T6PS	SL-C30SA	
SL-C7UB		SL-C30UB	
SL-T7ME		SL-C33EC	
SL-T7MER		SL-C34AS	
SL-T9		SL-C34SA	
SL-T9ME		SL-C35AS	
SL-T9MER		SL-C40ES	

SONY®

Consumer VIDEO

www.freeservicemanuals.info

TABLE OF CONTENTS

	Title	Page
LIST OF CHASSIS TYPES		1
SECTION 1	**SL-C/710 TYPE (NTSC SYSTEM)**	
1-1.	Terminology	3
1-2.	Preparations for Adjustment	3
1-3.	Entrance Side Adjustment	4
1-4.	Exit Side Adjustment	5
1-5.	Audio/CTL Position Adjustment	7
1-6.	Audio Height Adjustment	8
1-7.	Self-recorded RF Output Waveform Check	9
1-8.	Pairing Check	9
1-9.	Tape Running Development Chart	10
SECTION 2	**SL-C/710 TYPE (CCIR SYSTEM)**	
2-1.	Terminology	11
2-2.	Preparations for Adjustment	11
2-3.	Entrance Side Adjustment	12
2-4.	Exit Side Adjustment	13
2-5.	Audio/CTL Position Adjustment	15
2-6.	Audio Height Adjustment	16
2-7.	Self-recorded RF Output Waveform Check	17
2-8.	Pairing Check	17
2-9.	Tape Running Development Chart	18
SECTION 3	**711 TYPE (NTSC SYSTEM)**	
3-1.	Terminology	19
3-2.	Preparations for Adjustment	19
3-3.	Entrance Side Adjustment	20
3-4.	Exit Side Adjustment	22
3-5.	S Reel Damage Check	24
3-6.	Audio/CTL Position Adjustment	24
3-7.	Audio Height Adjustment	25
3-8.	Self-recorded RF Output Waveform Check	26
3-9.	Pairing Check	26
3-10.	Tape Running Development Chart	27
SECTION 4	**711 TYPE (CCIR SYSTEM)**	
4-1.	Terminology	28
4-2.	Preparations for Adjustment	28
4-3.	Entrance Side Adjustment	29
4-4.	Exit Side Adjustment	31
4-5.	S Reel Damage Check	33
4-6.	Audio/CTL Position Adjustment	33
4-7.	Audio Height Adjustment	34
4-8.	Self-recorded RF Output Waveform Check	35
4-9.	Pairing Check	35
4-10.	Tape Running Development Chart	36

www.freeservicemanuals.info

SECTION 1

SL-C/710 (NTSC SYSTEM)

This adjustment is performed so that the tape runs correctly in a set position, and has a large effect on picture quality and interchangeability. Perform the adjustment in the order given below.

1-1. Terminology

The No. 0, 1 and 2 guides on the tape guide location diagram (Fig. 1-1) are called the entrance side guides, and No. 3, 4 and 5 guides are the exit side guides. When the alignment tape (KR5-1M) is played, the side to the left of center of the RF output waveform on the oscilloscope is called the "entrance side", and the waveform is mainly affected by the entrance side guides. The right side is called the "exit side" and is mainly affected by the exit side guides. (Fig. 1-2)

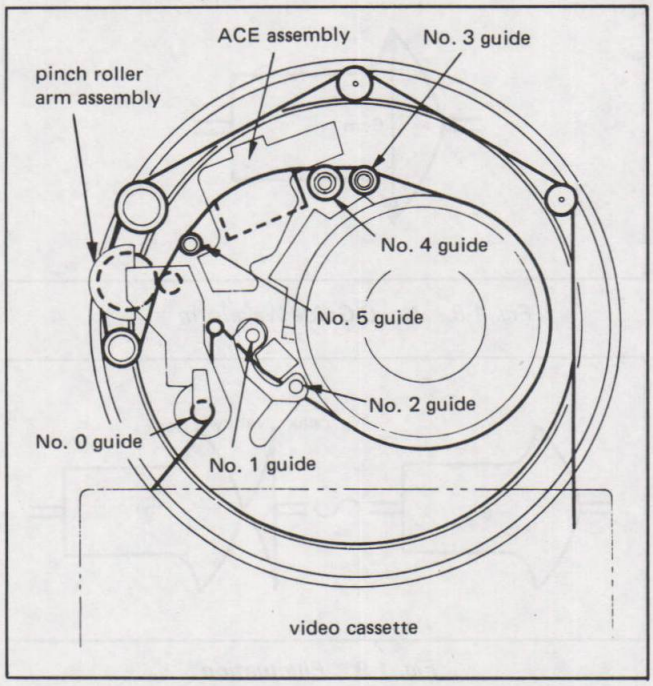


Fig. 1-1 Tape Guide Location Diagram

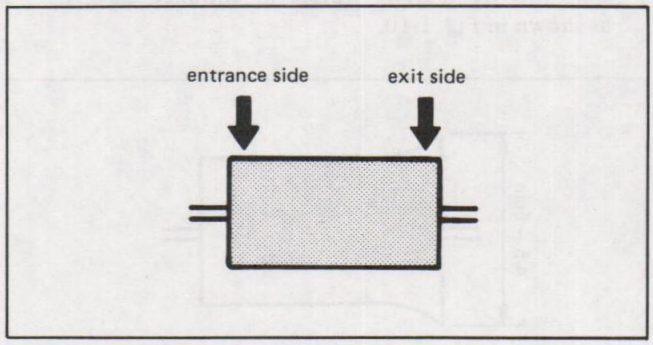


Fig. 1-2 RF Output Waveform

1-2. Preparations for Adjustment

1) Clean the tape running surface (tape guides, drum, capstan, pinch roller, ACE head, etc.) with a cleaning cloth dipped in methanol.
2) Connect the oscilloscope to RF board RF output pin and the external trigger to the switching pulse pin.
3) Play back the tracking portion of the alignment tape (KR5-1M).
4) Turn the tracking control knob to the position where the oscilloscope RF output waveform center portion is maximum.
5) Adjust oscilloscope V GAIN so that the RF output waveform center portion is 6cm on the oscilloscope. (Fig. 1-3)

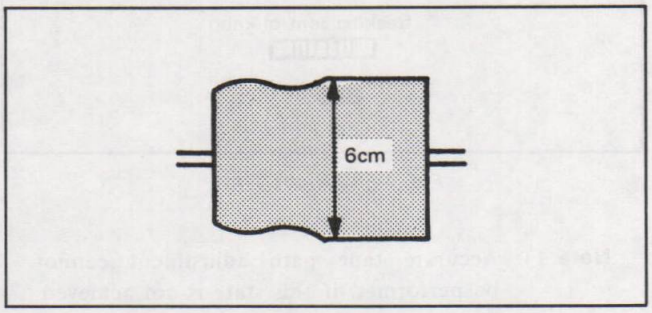


Fig. 1-3

6) Return the tracking control knob to center click and confirm that the RF output waveform is more than 5cm. (Fig. 1-4) When it is less than 5cm, refer to the section on CTL position adjustment and perform coarse adjustment.

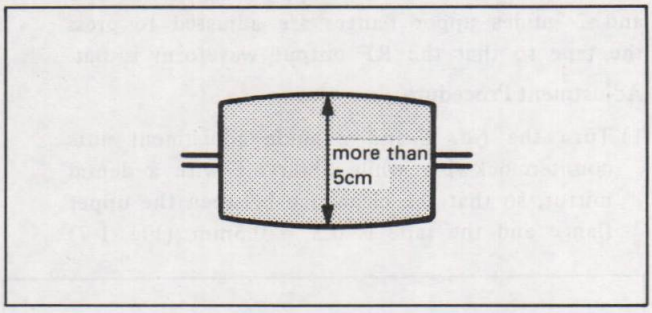


Fig. 1-4 Center Click Waveform

7) Turn the tracking control knob to the right (Fig. 1-6), as seen from the front, so that the center of the RF output waveform on the oscilloscope is 4cm. (Fig. 1-5) Normally, "2/3 right turn = 4cm waveform". Tape path adjustment is performed in this state. The following adjustments are all performed at 2/3 right turn waveform unless otherwise indicated.

www.freeservicemanuals.info

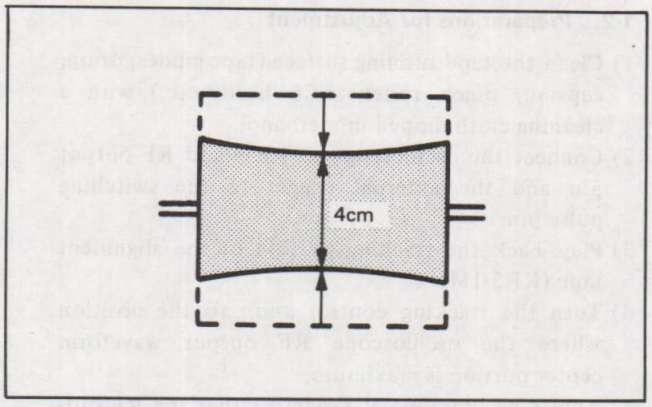


Fig. 1-5 2/3 Right Turn Waveform

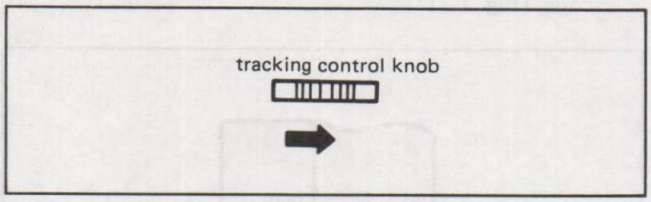


Fig. 1-6 Right Turn

Note 1): Accurate tape path adjustment cannot be performed if this state is not achieved. Be sure to do tape path adjustment in this state.

2): The adjustment guides have screw lock applied to secure them, so remove the screw lock with alcohol first.

1-3. Entrance Side Adjustment

The adjustment locations are the No. 0, 1 and 2 guides. No. 0 guide lower or upper flange and No. 1 and 2 guides upper flanges are adjusted to press the tape so that the RF output waveform is flat.

Adjustment Procedure:

1) Turn the No. 1 and 2 guide adjustment nuts counterclockwise, while observing with a dental mirror, so that the cleanance between the upper flange and the tape is 0.3 – 0.5mm. (Fig. 1-7)

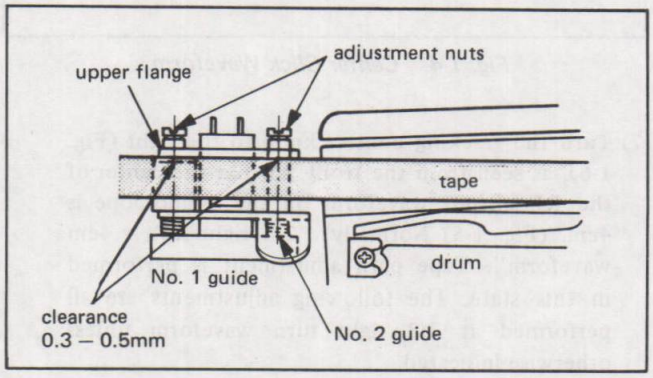


Fig. 1-7

2) While observing the RF output waveform, turn the ⊖ screw at the top of the No. 0 guide slowly to raise and lower the guide (after 30° turn, observe the waveform for 5 – 10 seconds), so that the RF output waveform entrance side is as shown in Fig. 1-8.

Note: Do not press the No. 0 guide screw hard when adjusting. As much as possible, utilize the turning force of the screw.

When No. 0 guide is raised, the number of peaks and valleys increases as shown in Fig. 1-9 ⓑ, and decreases when it is lowered. When the waveform fluctuates from ⓐ to ⓑ as shown in Fig. 1-9, adjust No. 0 guide so that a waveform becomes like the waveform in Fig. 1-8.

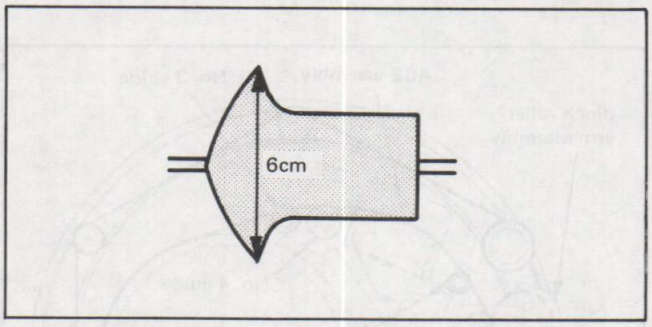


Fig. 1-8 No. 0 Guide Waveform

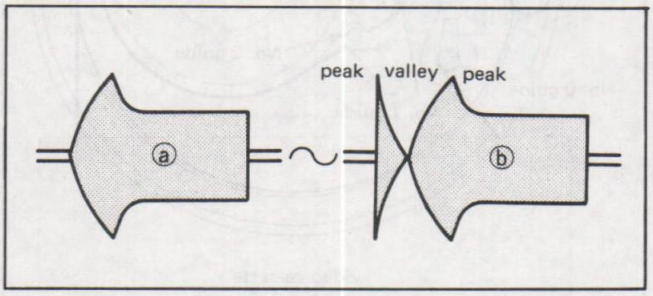


Fig. 1-9 Fluctuation

3) Turn No. 1 guide adjustment nut clockwise so that the RF output waveform entrance side is as shown in Fig. 1-10.

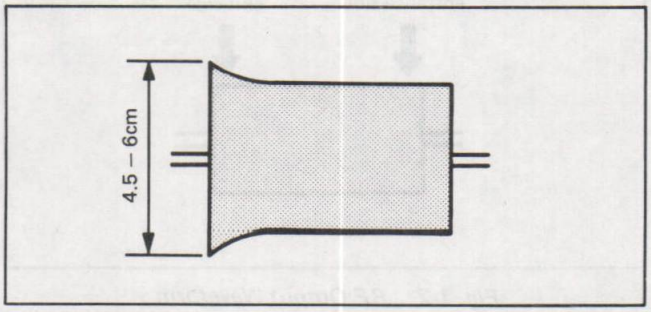


Fig. 1-10 No. 1 Guide Waveform

www.freeservicemanuals.info

4) Turn No. 2 guide adjustment nut clockwise so that the RF output waveform entrance side is 4cm as shown in Fig. 1-11.

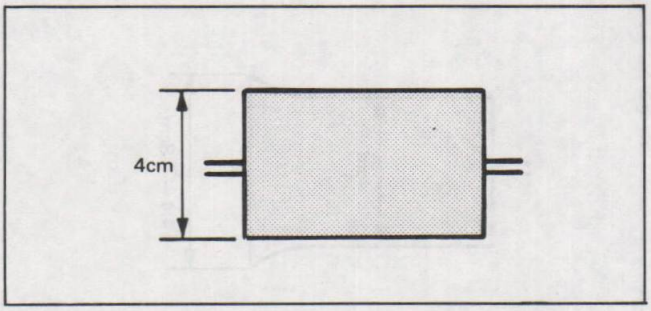


Fig. 1-11 No. 2 Guide Waveform

5) Check that the curl and the space between the No. 0, 1 and 2 guide flanges and the tape satisfy the specifications.

Curl: Less than 1mm for No. 0, 1 and 2 guides
Space: None for all three guides

Note: Curl, Space
When the guide flange presses the tape too much, the tape is distorted and curl results. When the flange is not pressing the tape, there is space between the tape and flange. Check these with a dental mirror. (Fig. 1-12)

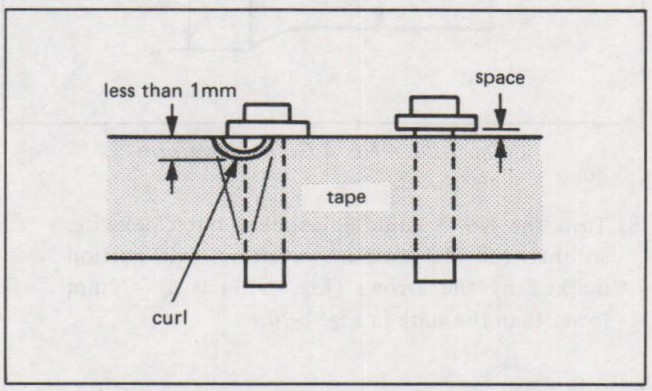


Fig. 1-12 Curl/Space

1-4. Exit Side Adjustment

The adjustment locations are No. 3, 4 and 5 guides and the ACE head. The exit guides all press the tape with the upper flange. For the exit side adjustment, when the guides are moved the CTL position changes, so perform the adjustment while constantly maintaining a 2/3 right turn waveform with the tracking control knob. (The center level must be 4cm or adjustment cannot be done accurately.)

Adjustment Procedure:

1) Turn No. 3, 4 and 5 guide adjustment nuts counter-clockwise, while observing with a dental mirror, so that the clearance between the upper flanges and the tape is 0.3 – 0.5mm. (Fig. 1-13)

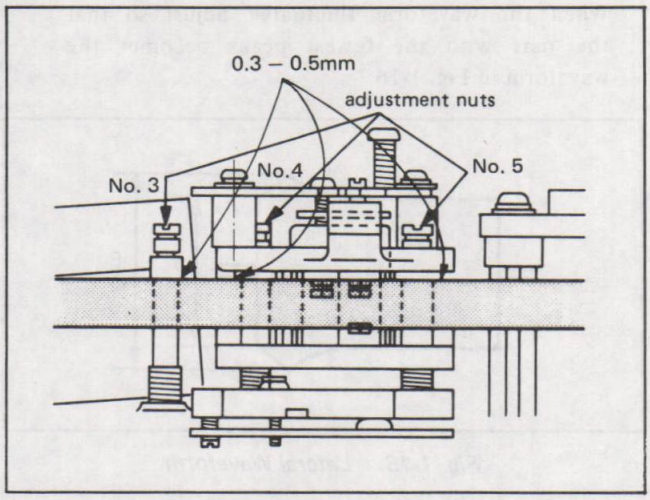


Fig. 1-13 Exit Guide

2) Loosen the ACE lock nut about 360°. (Fig. 1-14)

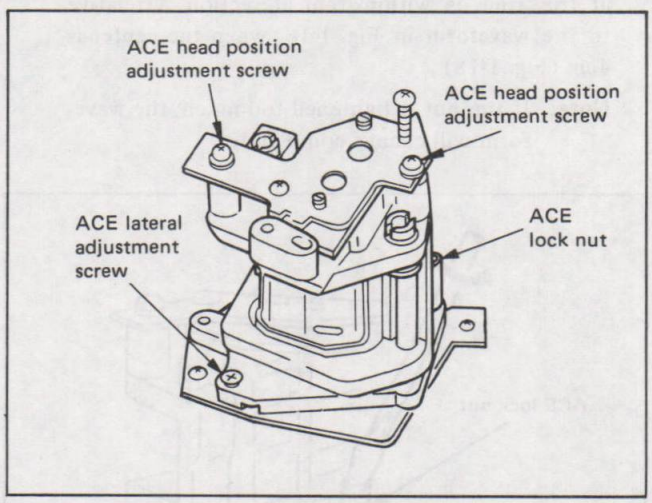


Fig. 1-14 ACE Assembly

3) While observing the RF output waveform, turn the ACE lateral adjustment screw slowly counter-clockwise, confirm that there are peaks and valleys as shown in Fig. 1-15 and stop turning.

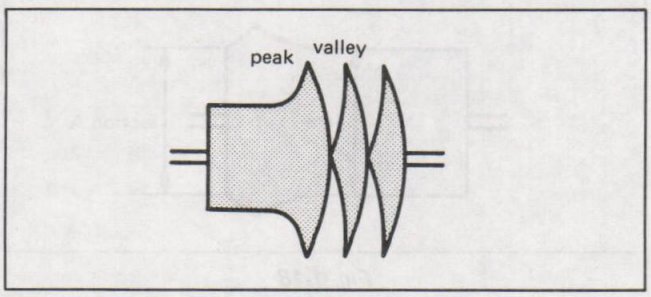


Fig. 1-15

www.freeservicemanuals.info

4) While observing the RF output waveform, turn the ACE lateral adjustment screw slowly clockwise (after 30° turn, observe for 5 – 10 seconds), so that the waveform is as shown in Fig. 1-16. When the waveform fluctuates, adjust so that the part with the fewest peaks becomes the waveform in Fig. 1-16.

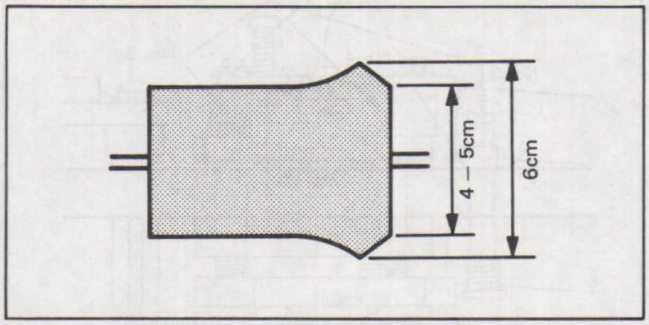


Fig. 1-16 Lateral Waveform

5) Turn the ACE lock nut clockwise with a screwdriver and tighten lightly. (Fig. 1-17)
Conform that the change in the RF waveform at this time is within 1cm at section A relative to the waveform in Fig. 1-16, when the center is 4cm (Fig. 1-18)

Note: If the nut is tightened too much, the waveform will change completely.

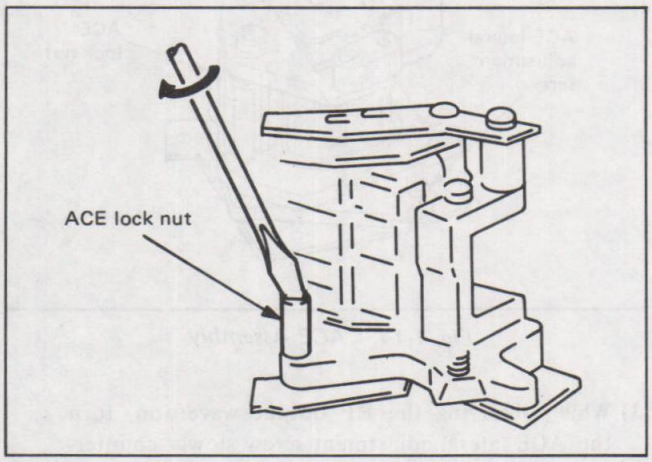


Fig. 1-17

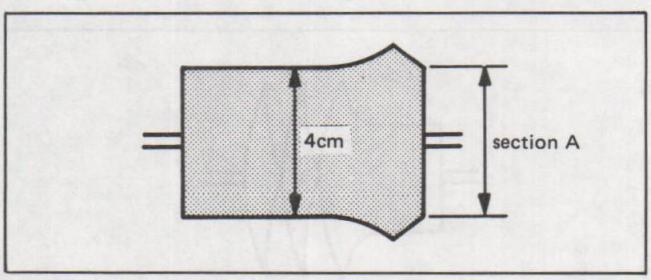


Fig. 1-18

6) Turn No. 5 guide adjustment nut clockwise so that the RF output waveform is as shown in Fig. 1-19.

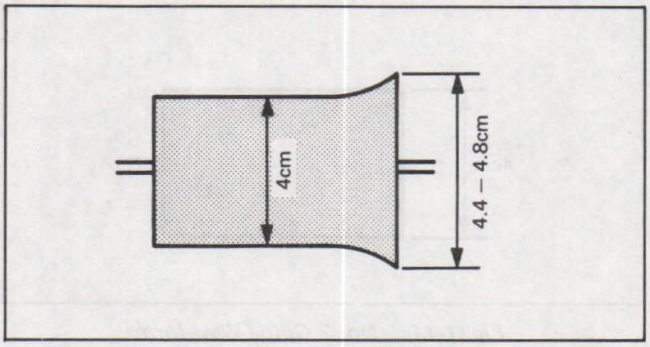


Fig. 1-19 No. 5 Guide Waveform

7) Turn No. 4 guide adjustment nut clockwise, so that the RF output waveform is as shown in Fig. 1-20.

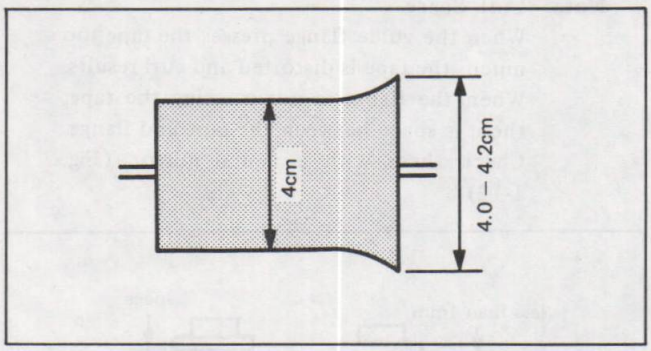


Fig. 1-20 No. 4 Guide Waveform

8) Turn the No. 3 guide adjustment nut clockwise, so that the RF output waveform exit portion marked by the arrows (Fig. 1-21) is 1 – 2mm lower than the state in Fig. 1-20.

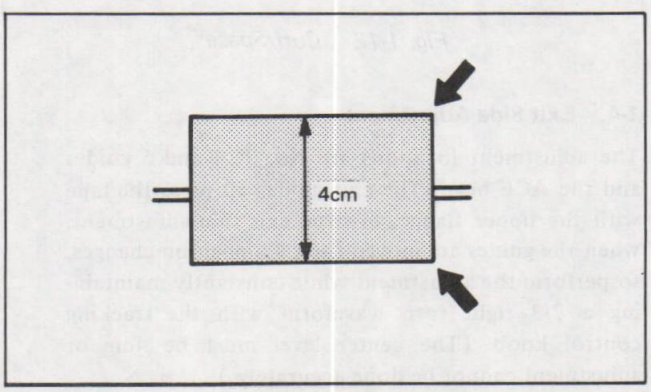


Fig. 1-21 No. 3 Guide Waveform

www.freeservicemanuals.info

9) Check that the No. 3, 4 and 5 guides space and curl satisfy the specifications.
Space: None for all three guides
Curl: No. 3, 4 guides, less than 1mm. None for No. 5 guide.

1-5. Audio/CTL Position Adjustment

1) Audio Head Azimuth Adjustment

Refer to the section on "Audio Head (ACE ass'y) Azimuth Adjustment" in the Service Manual.

Connection of Equipment:

The connections of the equipment to the input/output terminals are shown in Fig. 1-22.

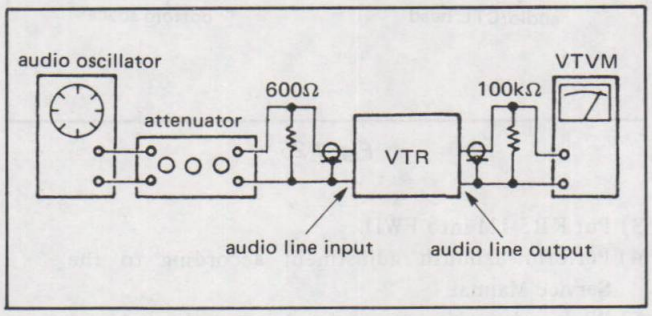


Fig. 1-22 Connections

(1) Terminate the audio line output terminal with a 100kΩ resistor and connect a VTVM.
(2) Play back the 5kHz signal segment of the alignment tape (KR5-1M).
(3) Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 1-22.)

Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

2) CTL Position Adjustment

Adjust ACE head position so that the RF output waveform is maximum when the tracking control knob is at center click.
Refer to the section on "ACE Assembly Position Adjustment" in the Service Manual.

Note: Be sure to perform with tracking control knob at center click.

Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

(1) Connect a dual-trace oscilloscope as follows.
CH-1 . . . . . RF OUT
CH-2 . . . . . AUDIO OUT
Ext Trigger. . . . . SWITCHING PULSE OUT
(2) Play back (βII mode) the 1MHz segment of alignment tape (KR5-1M) (See Fig. 1-23).
(3) Set the tracking control to the center detent position and confirm that the output waveform level is maximum and the 0 level point of the audio signal appears at the Bch waveform point as shown in Fig. 1-23. If the specification is not satisfied, perform the following Step 4.

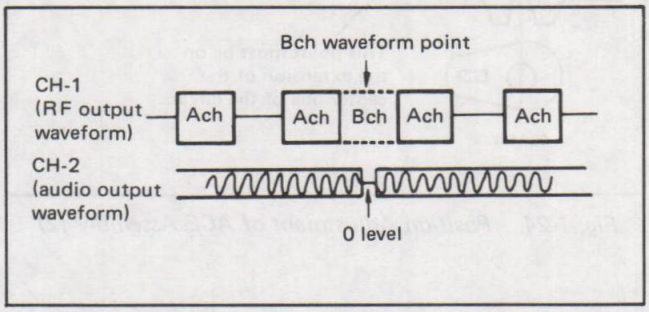


Fig. 1-23 Position Adjustment of ACE Assembly (1)

(4) Perform the tracking control center adjustment.
(5) Set the TRACKING control knob to its center detent point and play back the 1MHz segment of the alignment tape (KR5-1M).
(6) Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and a 0 level of audio signal at the Bch waveform point. (See Fig. 1-23.)

Note: Perform the adjustment so that the center of the cut-out section of the A section will almost match the center of the round hole.

(7) Play back the 1MHz segment of the alignment tape and confirm the proper picture appearance.
(8) Tighten the position adjusting screw of the ACE head.

www.freeservicemanuals.info

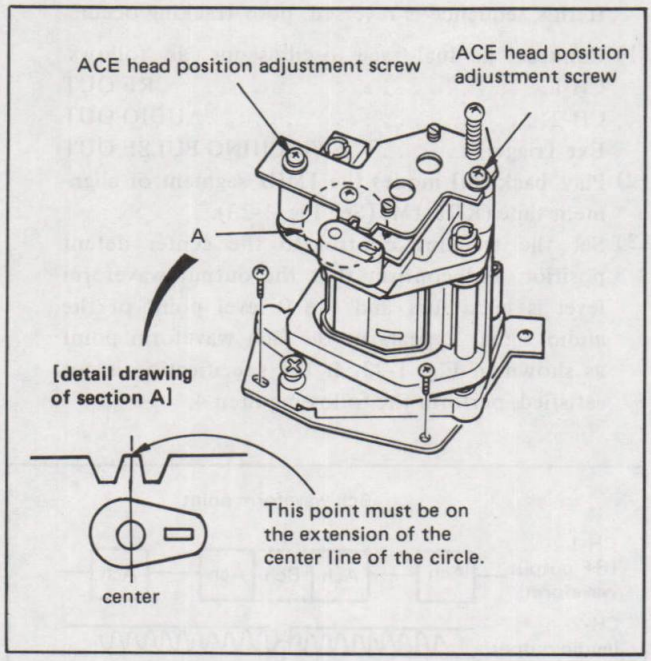

ACE head position adjustment screw
ACE head position adjustment screw
A
[detail drawing of section A]
This point must be on the extension of the center line of the circle.
center

Fig. 1-24 Position Adjustment of ACE Assembly (2)

1-6. Audio Height Adjustment

This adjustment is basically unnecessary, as it is preadjusted at the factory. The same applies to the repair ACE assembly. However, if the adjustment screw has been touched and it is absolutely necessary to adjust, perform the following procedure.

Parallel Adjustment Relative to ACE Head Guide

1) Place the parallel plate SL-0657 on No. 5 guide and audio/CTL head. (Fig. 1-25)

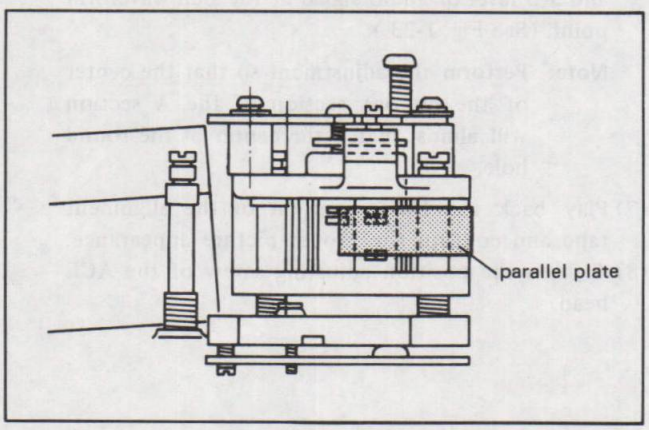


Fig. 1-25

2) With No. 5 guide as reference, confirm that there is no space between the audio/CTL head and the parallel plate. If there is space at the top (Fig. 1-26 ①), adjust by turning the height adjustment screw Ⓐ counterclockwise. (Fig. 1-27)

If there is space at the bottom (Fig. 1-26 ②), adjust by turning the height adjustment screw Ⓐ clockwise.

(Judge if there is space by pressing the parallel plate with a finger to see if there is play.)

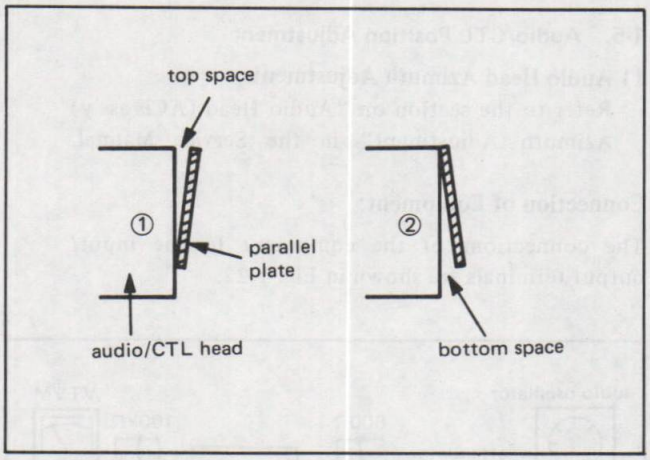


Fig. 1-26

3) Put KR5-1M into FWD.
4) Perform azimuth adjustment according to the Service Manual.
5) While observing the audio head with a dental mirror, match up the core upper edge and tape upper edge as in Fig. 1-28, with the two height adjustment screws and the azimuth adjustment screw.

Turn the two height adjustment screws in the same direction at the same angle, and the azimuth adjustment screw in the opposite direction at the same angle. Be sure to turn all three screws.

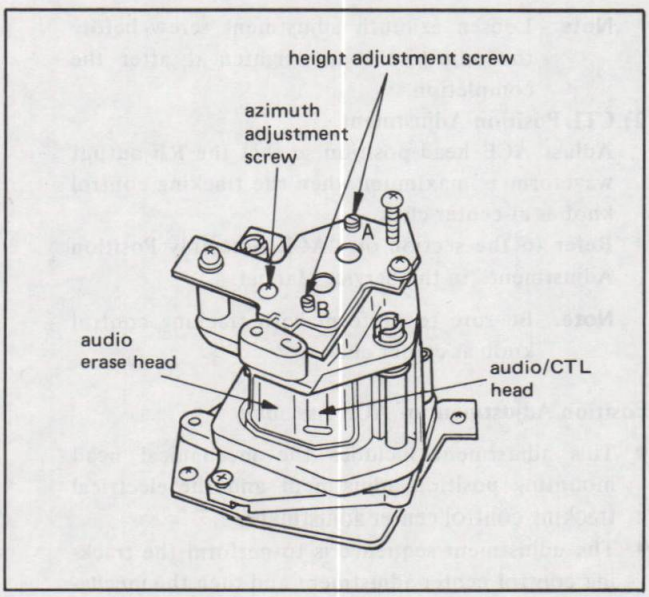


Fig. 1-27

www.freeservicemanuals.info

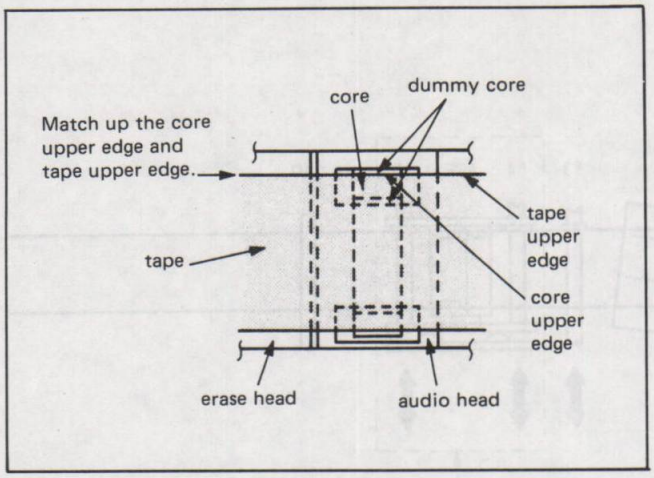


Fig. 1-28

6) From the position in 5), turn the two height adjustment screws clockwise 70° and turn the azimuth adjustment screw counterclockwise 70°. (This adjustment makes the tape upper edge 0.1mm above the core upper edge.)
The ACE head adjustment affects tape path, so it is necessary to perform exit side tape path adjustment and CTL position and azimuth check and adjustment.
Perform the exit side adjustment and audio/CTL position adjustment in the previous sections.

1-7. Self-Recorded RF Output Waveform Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Confirm that the RF output waveform satisfies the conditions in Fig. 1-29. If not, readjust tape path.

$$\textcircled{1}\ \frac{E\ min}{E\ max} \geqq 65\%$$

$$\textcircled{2}\ \text{at } 80\%\ \text{interval},\ \frac{E}{E\ max} \geqq 80\%$$

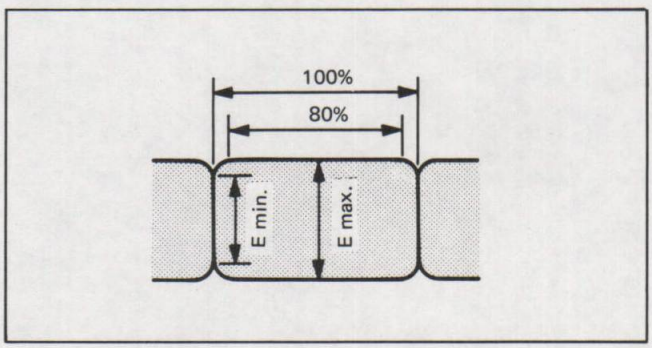


Fig. 1-29

1-8. Pairing Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Check CH-A, CH-B RF output levels.
4) Match up CH-A and CH-B RF output levels with RP board CH balance. (Fig. 1-30)

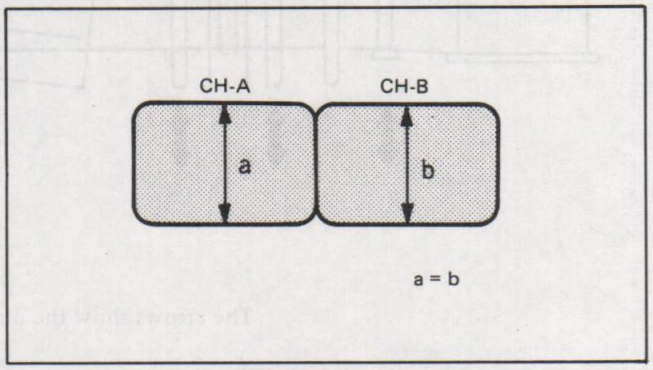


Fig. 1-30

5) Adjust oscilloscope V GAIN so that the RF output waveform on the oscilloscope is 5cm.
6) Turn the tracking control knob to the right, as seen from the front, and make the large output waveform 2cm. (Fig. 1-31)

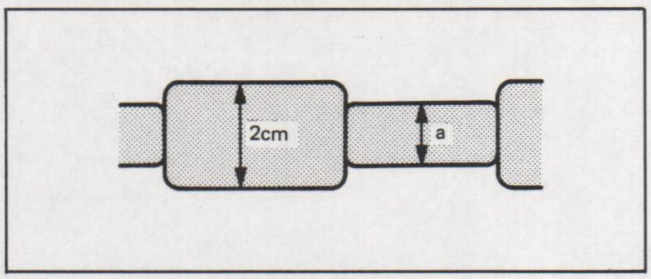
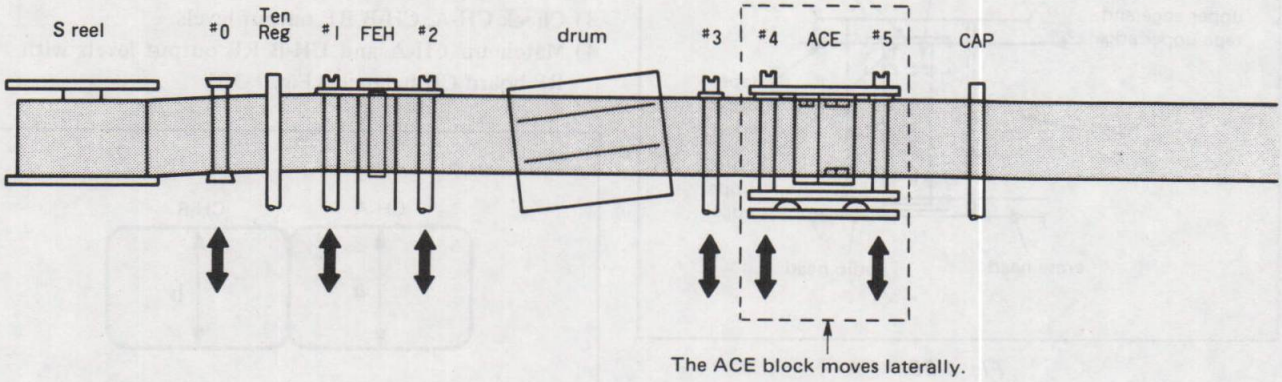


Fig. 1-31

7) At this time, check that the small output channel's output satisfies the specification.
Specification: small output CH 1.0 – 2.0cm (Fig. 1-31 a)
8) Return oscilloscope V GAIN to its original state, and return RF output level to the state in 3) with CH balance.

www.freeservicemanuals.info

1-9. Tape Running Development Chart



The arrows show the directions of the movement.

Fig. 1-32

www.freeservicemanuals.info

SECTION 2

SL-C/710 (CCIR SYSTEM)

This adjustment is performed so that the tape runs correctly in a set position, and has a large effect on picture quality and interchangeability. Perform the adjustment in the order given below.

2-1. Terminology

The No. 0, 1 and 2 guides on the tape guide location diagram (Fig. 2-1) are called the entrance side guides, and No. 3, 4 and 5 guides are the exit side guides. When the alignment tape (KR5-2H) is played, the side to the left of center of the RF output waveform on the oscilloscope is called the "entrance side", and the waveform is mainly affected by the entrance side guides. The right side is called the "exit side" and is mainly affected by the exit side guides. (Fig. 2-2)

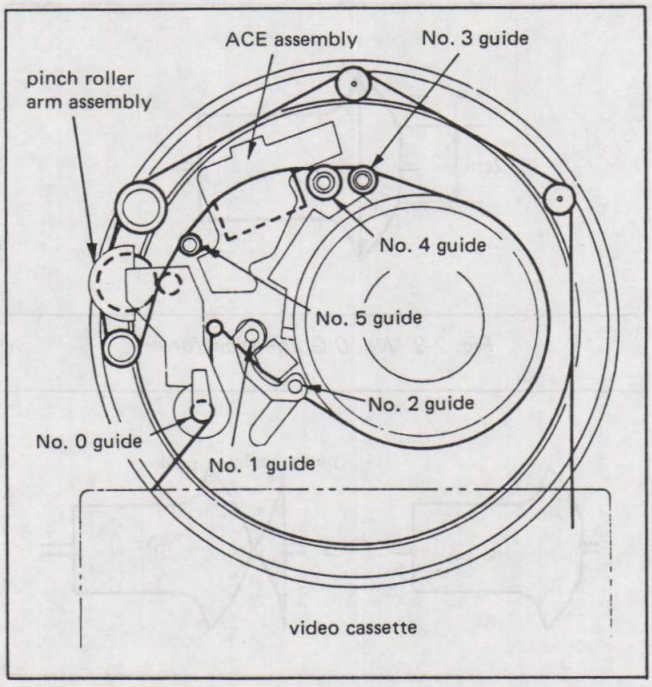


Fig. 2-1 Tape Guide Location Diagram

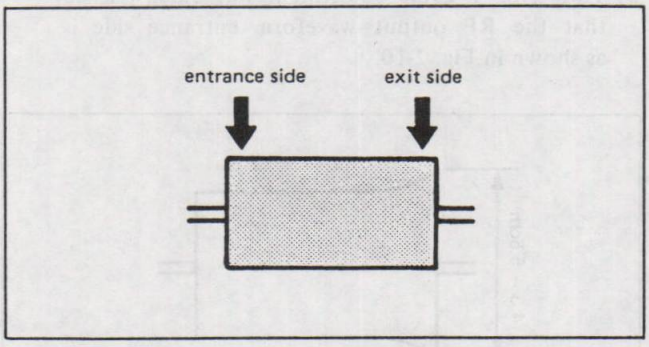


Fig. 2-2 RF Output Waveform

2-2. Preparations for Adjustment

1) Clean the tape running surfaces (tape guides, drum, capstan, pinch roller, ACE head, etc.) with a cleaning cloth dipped in methanol.
2) Connect the oscilloscope to RF board RF output pin and the external trigger to the switching pulse pin.
3) Play back the tracking portion of the alignment tape (KR5-2H).
4) Turn the tracking control knob to the position where the oscilloscope RF output waveform center portion is maximum.
5) Adjust oscilloscope V GAIN so that the RF output waveform center portion is 6cm on the oscilloscope. (Fig. 2-3)

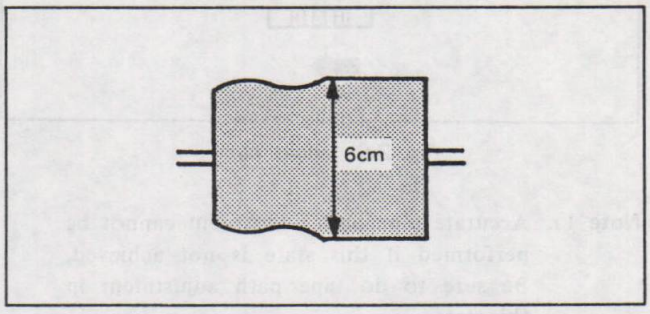


Fig. 2-3

6) Return the tracking control knob to center click and confirm that the RF output waveform is more than 5cm. (Fig. 2-4) When it is less than 5cm, refer to the section on CTL position adjustment and perform coarse adjustment.

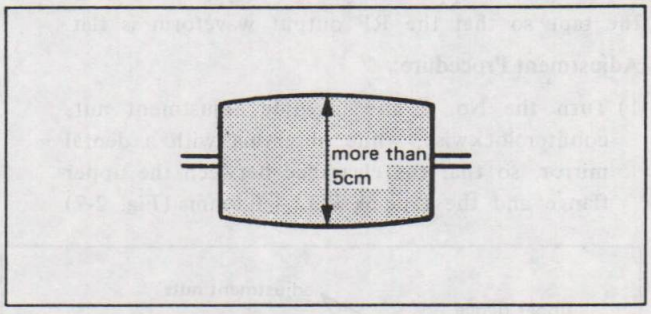


Fig. 2-4 Center Click Waveform

7) Turn the tracking control knob to the right (Fig. 2-6), as seen from the front, so that the center of the RF output waveform on the oscilloscope is 4cm. (Fig. 2-5) Normally, "2/3 right turn = 4cm waveform". Tape path adjustment is performed in this state. The following adjustments are all performed at 2/3 right turn waveform unless otherwise indicated.

www.freeservicemanuals.info

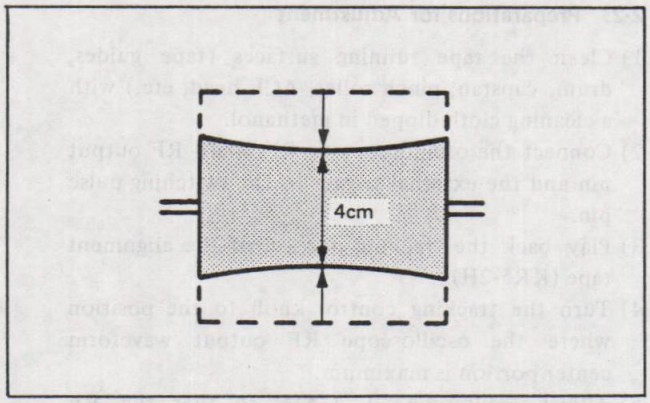


Fig. 2-5 2/3 Right Turn Waveform

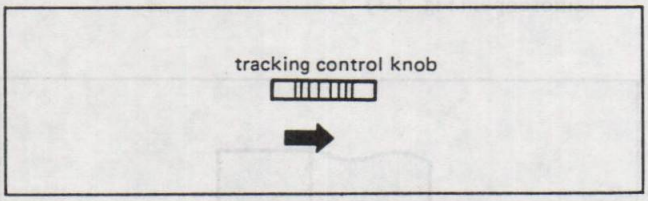


Fig. 2-6 Right Turn

Note 1): Accurate tape path adjustment cannot be performed if this state is not achieved. Be sure to do tape path adjustment in this state.

2): The adjustment guides have screw lock applied to secure them, so remove the screw lock with alcohol first.

2-3. Entrance Side Adjustment

The adjustment locations are the No. 0, 1 and 2 guides. No. 0 guide lower or upper flange and No. 1 and 2 guides upper flanges are adjusted to press the tape so that the RF output waveform is flat.

Adjustment Procedure:

1) Turn the No. 1 and 2 guide adjustment nuts counterclockwise, while observing with a dental mirror, so that the clearance between the upper flange and the tape is 0.3 – 0.5mm. (Fig. 2-7)

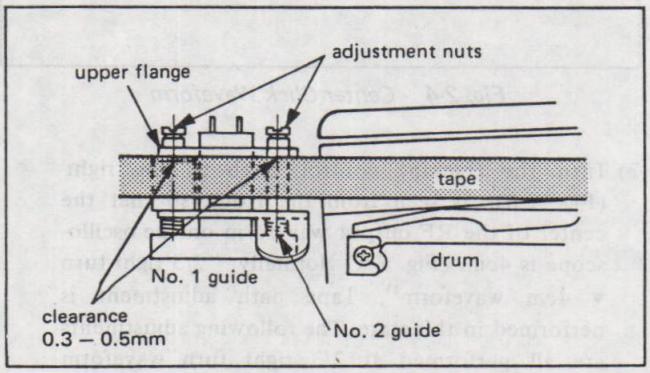


Fig. 2-7

2) While observing the RF output waveform, turn the ⊖ screw at the top of the No. 0 guide slowly to raise and lower the guide (after 30° turn, observe the waveform for 5 – 10 seconds), so that the RF output waveform entrance side is as shown in Fig. 2-8.

Note: Do not press the No. 0 guide screw hard when adjusting. As much as possible, utilize the turning force of the screw.

When No. 0 guide is raised, the number of peaks and valleys increases as shown in Fig. 2-9 ⓑ, and decreases when it is lowered. When the waveform fluctuates from ⓐ to ⓑ as shown in Fig. 2-9, adjust No. 0 guide so that a waveform becomes like the waveform in Fig. 2-8.

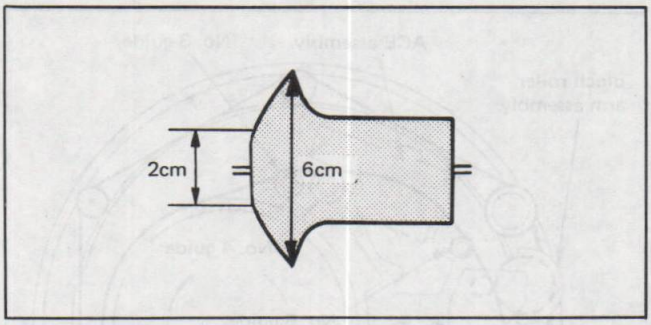


Fig. 2-8 No. 0 Guide Waveform

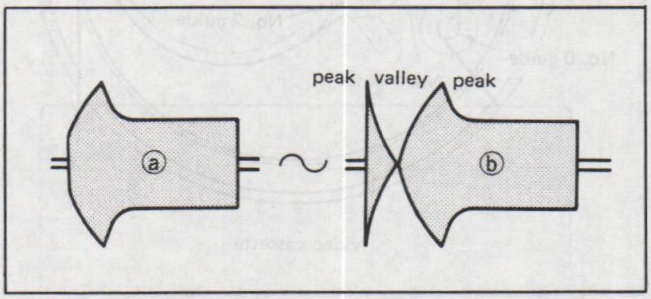


Fig. 2-9 Fluctuation

3) Turn No. 1 guide adjustment nut clockwise so that the RF output waveform entrance side is as shown in Fig. 2-10.

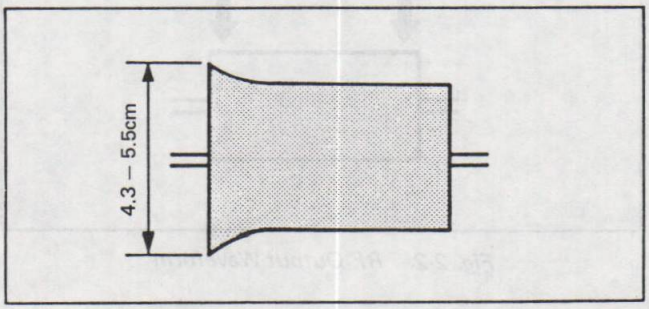


Fig. 2-10 No. 1 Guide Waveform

www.freeservicemanuals.info

4) Turn No. 2 guide adjustment nut clockwise so that the RF output waveform entrance side is 4cm as shown in Fig. 2-11.

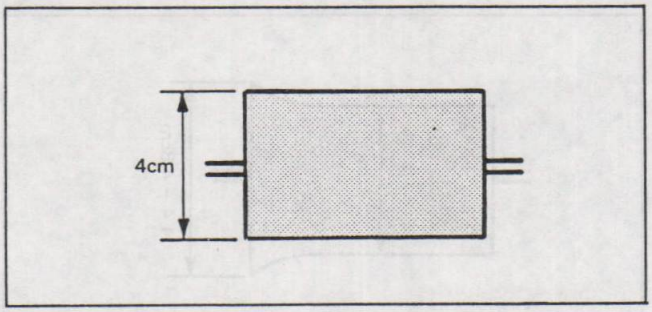


Fig. 2-11 No. 2 Guide Waveform

5) Check that the curl and the space between the No. 0, 1 and 2 guide flanges and the tape satisfy the specifications.

Curl: Less than 1mm for No. 0, 1 and 2 guides
Space: None for all three guides

Note: Curl, Space
When the guide flange presses the tape too much, the tape is distorted and curl results. When the flange is not pressing the tape, there is space between the tape and flange. Check these with a dental mirror. (Fig. 2-12)

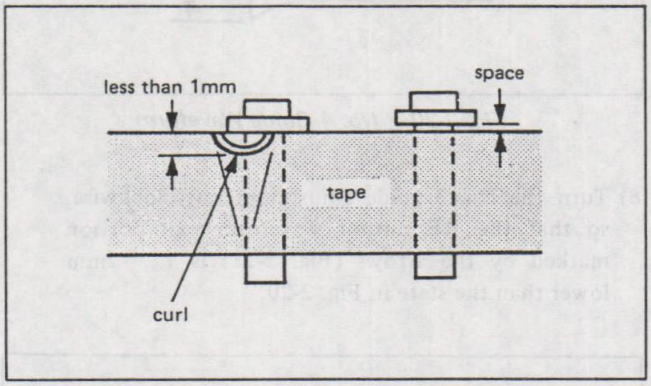


Fig. 2-12 Curl/Space

2-4. Exit Side Adjustment

The adjustment locations are No. 3, 4 and 5 guides and the ACE head. The exit guides all press the tape with the upper flange. For the exit side adjustment, when the guides are moved the CTL position changes, so perform the adjustment while constantly maintaining a 2/3 right turn waveform with the tracking control knob. (The center level must be 4cm or adjustment cannot be done accurately.)

Adjustment Procedure:

1) Turn No, 3, 4 and 5 guide adjustment nuts counter-clockwise, while observing with a dental mirror, so that the clearance between the upper flanges and the tape is 0.3 – 0.5mm. (Fig. 2-13)

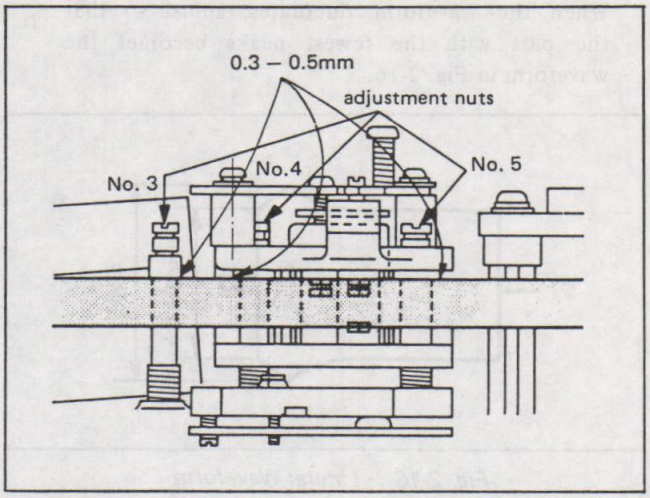


Fig. 2-13 Exit Guide

2) Loosen the ACE lock nut about 360°. (Fig. 2-14)

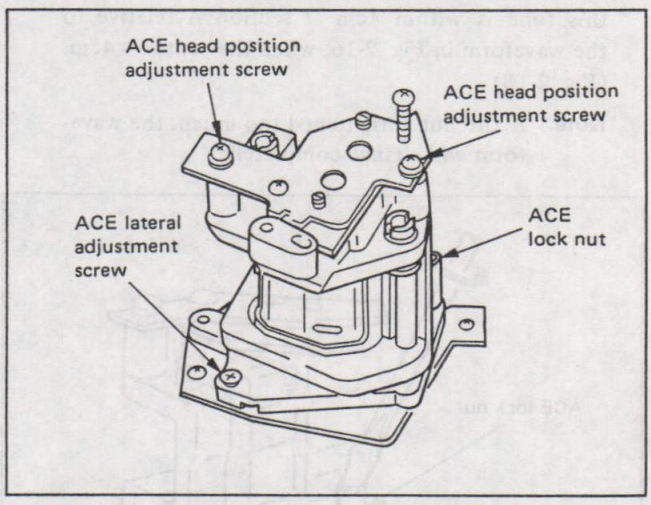


Fig. 2-14 ACE Assembly

3) While observing the RF output waveform, turn the ACE lateral adjustment screw slowly counter-clockwise, confirm that there are peaks and valleys as shown in Fig. 2-15 and stop turning.

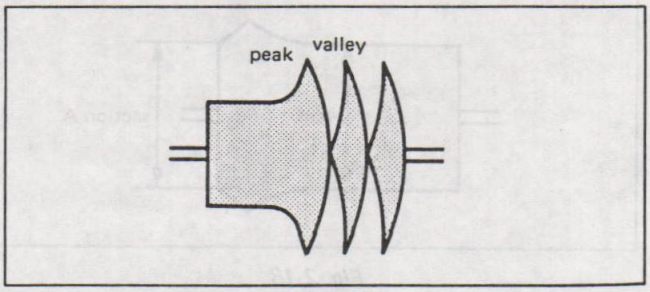


Fig. 2-15

www.freeservicemanuals.info

4) While observing the RF output waveform, turn the ACE lateral adjustment screw slowly clockwise (after 30° turn, observe for 5 – 10 seconds), so that the waveform is as shown in Fig. 2-16. When the waveform fluctuates, adjust so that the part with the fewest peaks becomes the waveform in Fig. 2-16.

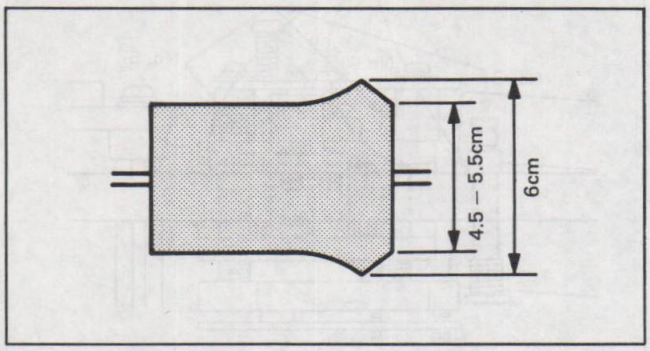


Fig. 2-16 Lateral Waveform

5) Turn the ACE lock nut clockwise with a screwdriver and tighten lightly. (Fig. 2-17)
Confirm that the change in the RF waveform at this time is within 1cm at section A relative to the waveform in Fig. 2-16, when the center is 4cm. (Fig. 2-18)

Note: If the nut is tightened too much, the waveform will change completely.

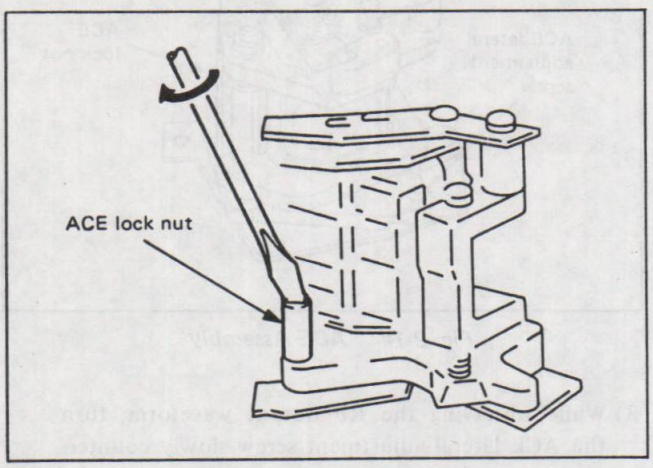


Fig. 2-17

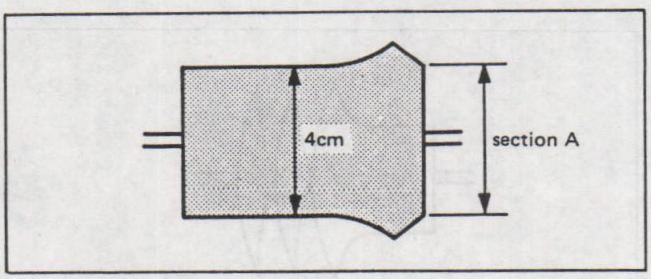


Fig. 2-18

6) Turn No. 5 guide adjustment nut clockwise so that the RF output waveform is as shown in Fig. 2-19.

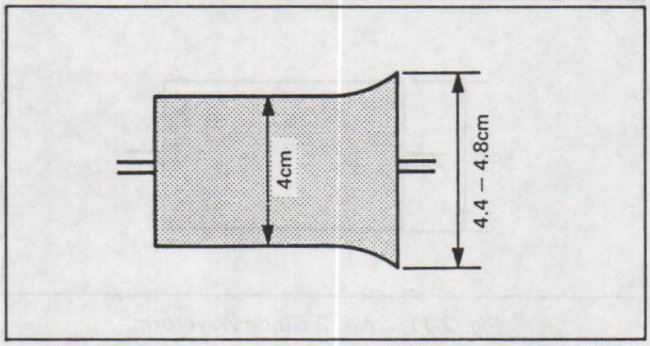


Fig. 2-19 No. 5 Guide Waveform

7) Turn No. 4 guide adjustment nut clockwise, so that the RF output waveform is as shown in Fig. 2-20.

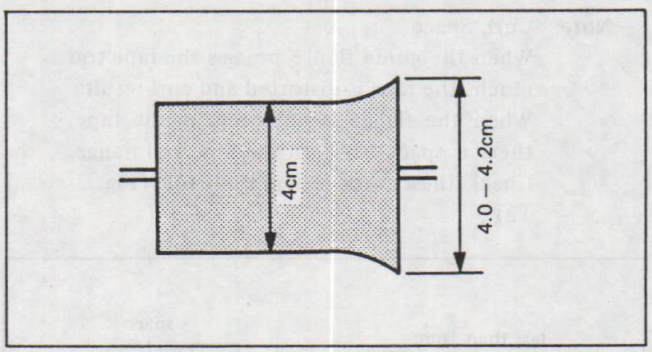


Fig. 2-20 No. 4 Guide Waveform

8) Turn the No. 3 guide adjustment nut clockwise, so that the RF output waveform exit portion marked by the arrows (Fig. 2-21) is 1 – 2mm lower than the state in Fig. 2-20.

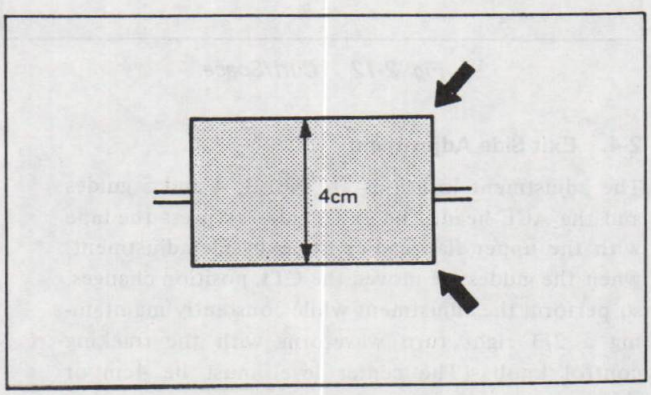


Fig. 2-21 No. 3 Guide Waveform

www.freeservicemanuals.info

9) Check that the No. 3, 4 and 5 guides space and curl satisfy the specifications.
Space: None for all three guides
Curl: No. 3, 4 guides, less than 1mm. None for No. 5 guide.

2-5. Audio/CTL Position Adjustment

1) Audio Head Azimuth Adjustment

Refer to the section on "Audio Head (ACE ass'y) Azimuth Adjustment" in the Service Manual.

Connection of Equipment:

The connections of the equipment to the input/output terminals are shown in Fig. 2-22.

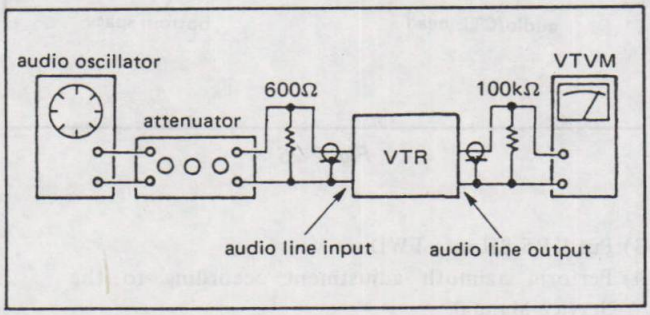


Fig. 2-22 Connections

(1) Terminate the audio line output terminal with a 100kΩ resistor and connect a VTVM.
(2) Play back the 5kHz signal segment of the alignment tape (KR5-2H).
(3) Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 2-22).

Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

2) CTL Position Adjustment

Adjust ACE head position so that the RF output waveform is maximum when the tracking control knob at center click.
Refer to the section on "ACE Assembly Position Adjustment" in the Service Manual.

Note: Be sure to perform with tracking control knob at center click.

Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

(1) Connect a dual-trace oscilloscope as follows.
CH-1 . . . . . RF OUT
CH-2 . . . . . AUDIO OUT
Ext trigger . . . . . SWITCHING PULSE OUT
(2) Play back (βII mode) the 1MHz segment of alignment tape KR5-2H (See Fig. 2-23).
(3) Set the tracking control to the center detent position and confirm that the output waveform level is maximum and the 0 level point of the audio signal appears at the Bch waveform point as shown in Fig. 2-23. If the specification is not satisfied, perform the following Step 4.

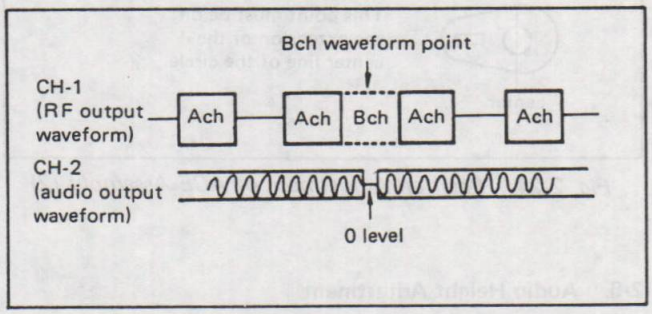


Fig. 2-23 Position Adjustment of ACE Assembly (1)

(4) Perform the tracking control center adjustment.
(5) Set the TRACKING control knob to its center detent point and play back the 1MHz segment of the alignment tape (KR5-2H).
(6) Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and a 0 level of audio signal at the Bch waveform point. (See Fig. 2-23.)

Note: Perform the adjustment so that the center of the cut-out section of the A section will almost match the center of the round hole.

(7) Play back the 1MHz segment of the alignment tape and confirm the proper picture appearance.
(8) Tighten the position adjusting screw of the ACE head.

www.freeservicemanuals.info

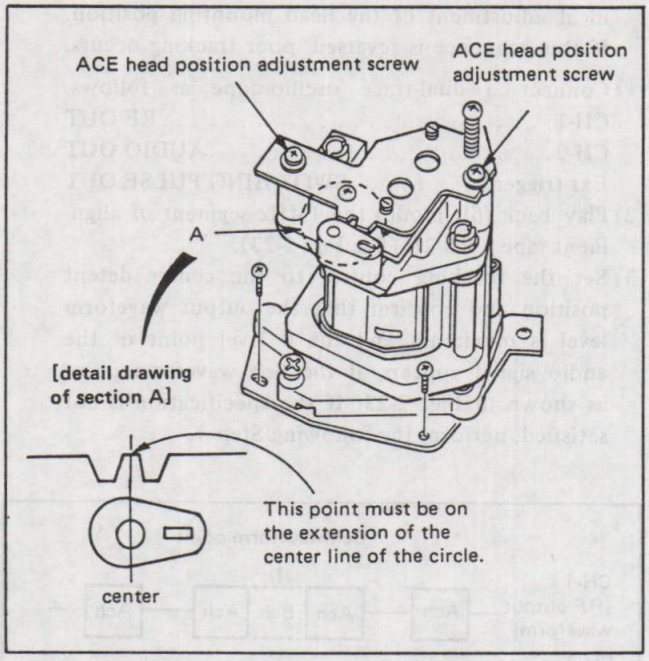

ACE head position adjustment screw
ACE head position adjustment screw
A
[detail drawing of section A]
This point must be on the extension of the center line of the circle.
center

Fig. 2-24 Position Adjustment of ACE Assembly (2)

2-6. Audio Height Adjustment

This adjustment is basically unnecessary, as it is preadjusted at the factory. The same applies to the repair ACE assembly. However, if the adjustment screw has been touched and it is absolutely necessary to adjust, perform the following procedure.

Parallel Adjustment Relative to ACE Head Guide

1) Place the parallel plate SL-0657 on No. 5 guide and audio/CTL head. (Fig. 2-25)

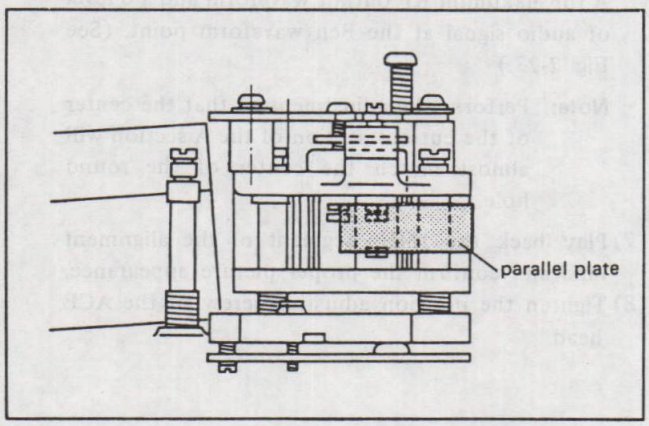


Fig. 2-25

2) With No. 5 guide as reference, confirm that there is no space between the audio/CTL head and the parallel plate. If there is space at the top (Fig. 2-26 ①), adjust by turning the height adjustment screw Ⓐ counterclockwise. (Fig. 2-27)

If there is space at the bottom (Fig. 2-26 ②), adjust by turning the height adjustment screw Ⓐ clockwise.

(Judge if there is space by pressing the parallel plate with a finger to see if there is play.)

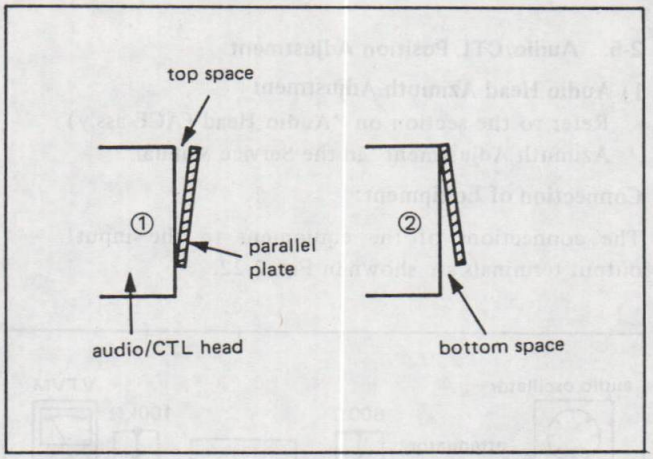


Fig. 2-26

3) Put KR5-2H into FWD.
4) Perform azimuth adjustment according to the Service Manual.
5) While observing the audio head with a dental mirror, match up the core upper edge and tape upper edge as in Fig. 2-28, with the two height adjustment screws and the azimuth adjustment screw.

Turn the two height adjustment screws in the same direction at the same angle, and the azimuth adjustment screw in the opposite direction at the same angle. Be sure to turn all three screws.

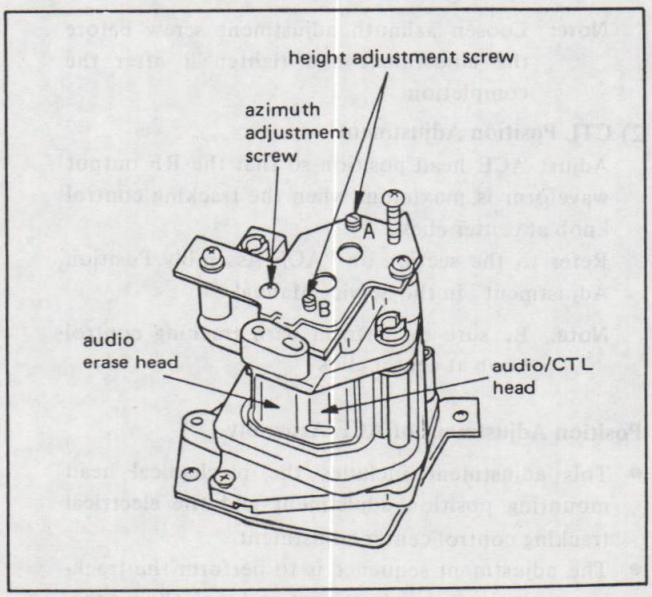


Fig. 2-27

www.freeservicemanuals.info

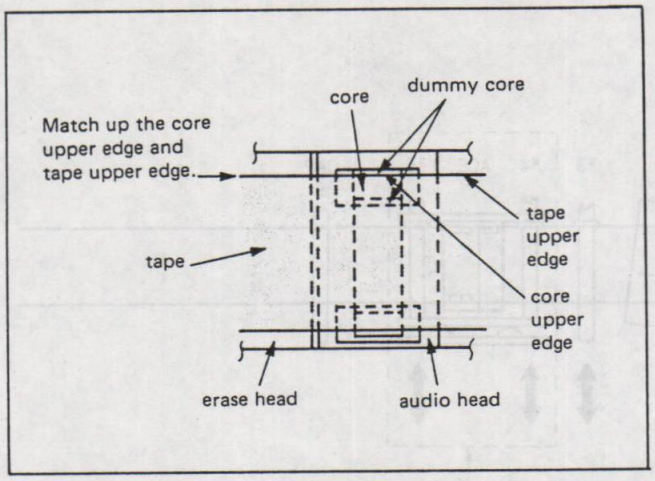


Fig. 2-28

6) From the position in 5), turn the two height adjustment screws clockwise 70° and turn the azimuth adjustment screw counterclockwise 70°. (This adjustment makes the tape upper edge 0.1mm above the core upper edge.)
The ACE head adjustment affects tape path, so it is necessary to perform exit side tape path adjustment and CTL position and azimuth check and adjustment.
Perform the exit side adjustment and audio/CTL position adjustment in the previous sections.

2-7. Self-Recorded RF Output Waveform Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Confirm that the RF output waveform satisfies the condition in Fig. 2-29. If not, readjust tape path.

$$① \frac{E\ min}{E\ max} \geqq 65\%$$

② at 80% interval, $\frac{E}{E\ max} \geqq 80\%$

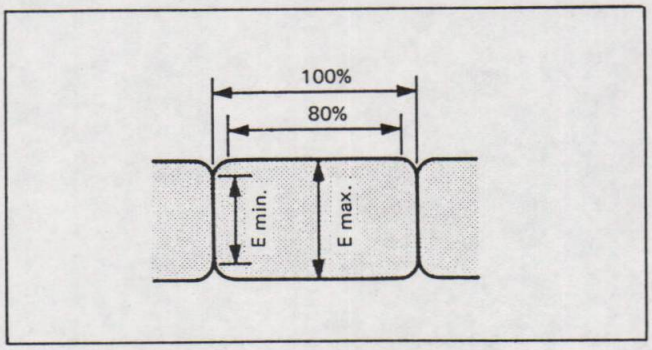


Fig. 2-29

2-8. Pairing Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Check CH-A, CH-B RF output levels.
4) Match up CH-A and CH-B RF output levels with RP board CH balance. (Fig. 2-30)

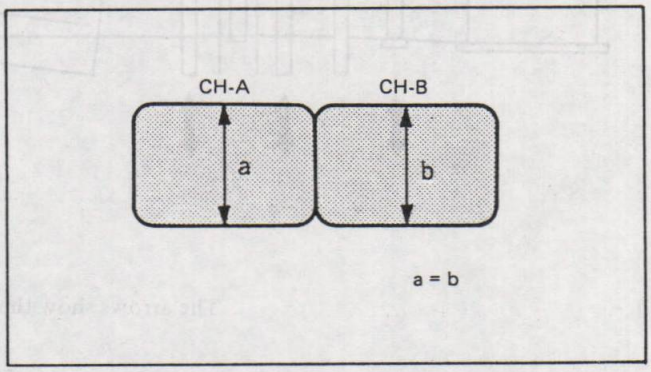


Fig. 2-30

5) Adjust oscilloscope V GAIN so that the RF output waveform on the oscilloscope is 5cm.
6) Turn the tracking control knob to the right, as seen from the front, and make the large output waveform 2cm. (Fig. 2-31)

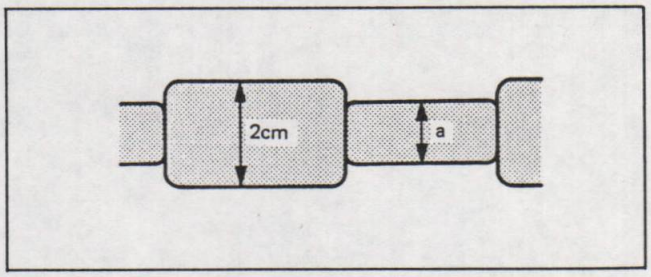
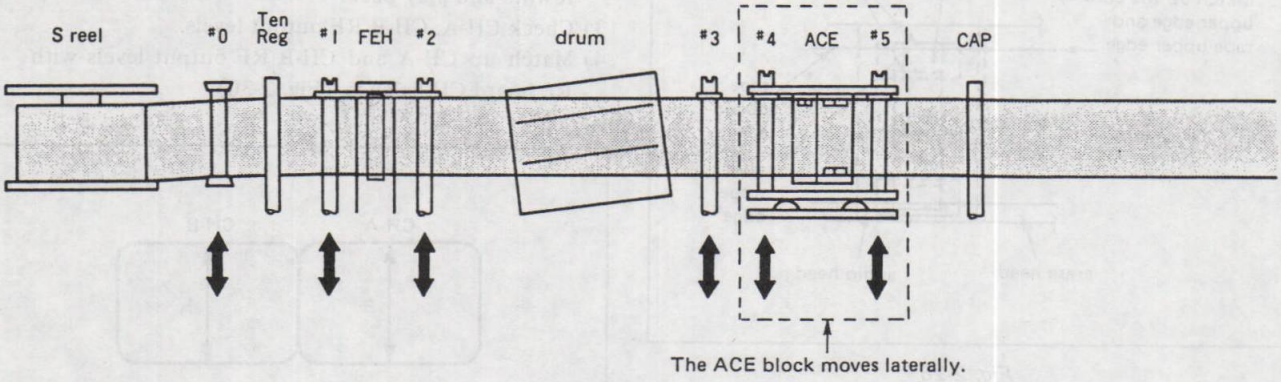


Fig. 2-31

7) At this time, check that the small output channel's output satisfies the specification.
Specification: small output CH 1.0 – 2.0cm (Fig. 2-31 a)
8) Return oscilloscope V GAIN to its original state, and return RF output level to the state in 3) with CH balance.

www.freeservicemanuals.info

2-9. Tape Running Development Chart



The arrows show the directions of the movement.

Fig. 2-32

www.freeservicemanuals.info

SECTION 3

711 TYPE (NTSC SYSTEM)

This adjustment is performed so that the tape runs correctly in a set position, and has a large effect on picture quality and interchangeability. Perform the adjustment in the order given below.

3-1. Terminology

The No. 0 to 6 guides on the tape guide location diagram (Fig. 3-1) are called the entrance side guides, and No. 7 to 10 guides are the exit side guides. When the alignment tape (KR5-1M)is played, the side to the left of center of the RF output waveform on the oscilloscope is called the "entrance side", and the waveform is mainly affected by the entrance side guides. The right side is called the "exit side" and is mainly affected by the exit side guides. (Fig. 3-2)

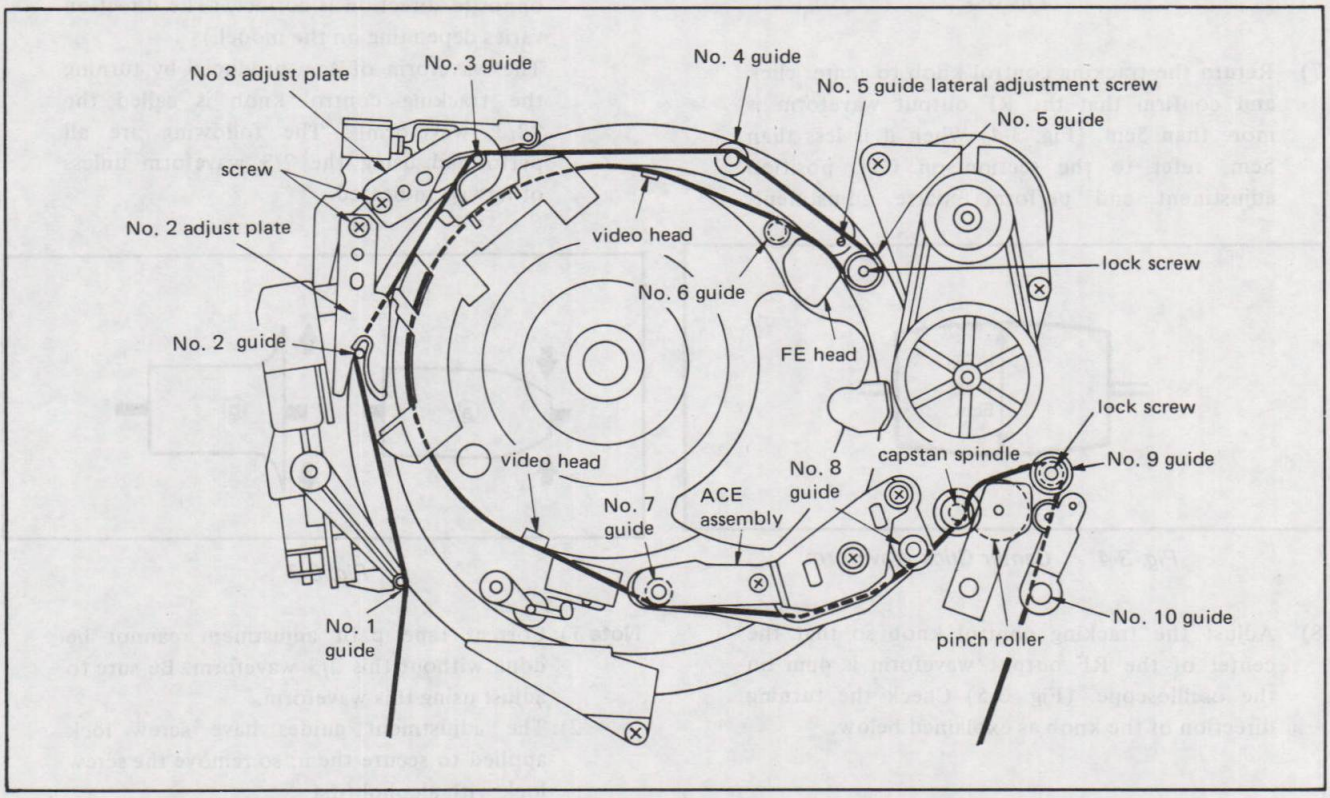


Fig. 3-1 Tape Guide Location Diagram

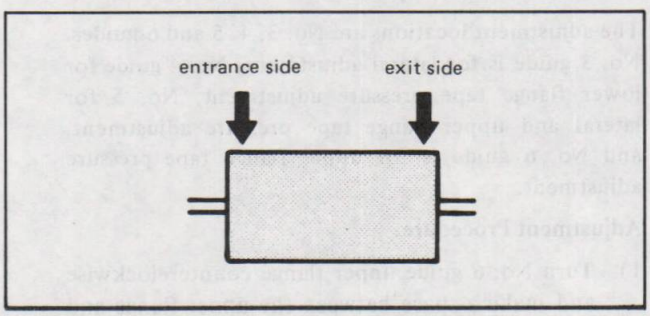


Fig. 3-2 RF Output Waveform

3-2. Preparations for Adjustment

1) Clean the tape running surfaces (tape guides, drum, capstan, pinch roller, ACE head, etc.) with a cleaning cloth dipped in methanol.
2) Remove the cassette lid of the alignment tape (KR5-1M) according to the instructions in the Service Manual.
3) Connect the oscilloscope to RF board RF output pin and the external trigger to the switching pulse pin.

www.freeservicemanuals.info

4) Play back the tracking portion of the alignment tape (KR5-1M).
5) Turn the tracking control knob to the position where the oscilloscope RF output waveform center portion is maximum.
6) Adjust oscilloscope V GAIN so that the RF output waveform center portion is 6cm on the oscilloscope. (Fig. 3-3)

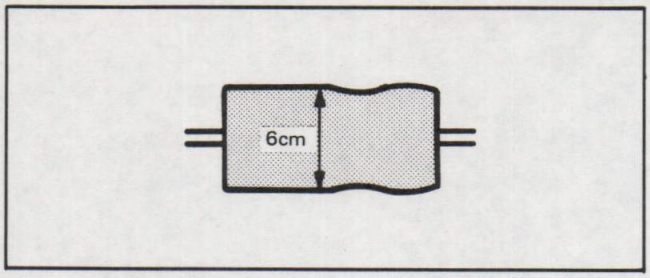


Fig. 3-3

7) Return the tracking control knob to center click and confirm that the RF output waveform is more than 5cm. (Fig. 3-4) When it is less than 5cm, refer to the section on CTL position adjustment and perform coarse adjustment.

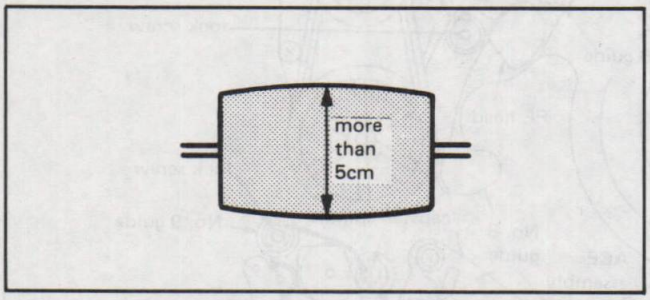


Fig. 3-4 Center Click Waveform

8) Adjust the tracking control knob so that the center of the RF output waveform is 4cm on the oscilloscope. (Fig. 3-5) Check the turning direction of the knob as explained below.

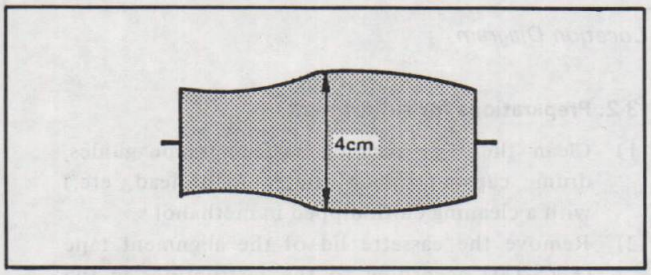


Fig. 3-5

(1) Turn the knob in either the clockwise or counterclockwise direction to make the waveform 4cm. (Fig. 3-6)

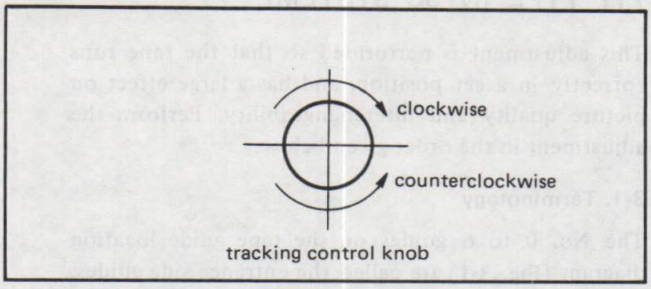


Fig. 3-6

(2) Turn the No. 6 guide clockwise.
(3) If the entrance portion of the waveform is as shown in Fig. 3-7 ⓐ and output is small, the direction that the tracking control knob is turned is correct.
If output is large as in Fig. 3-7 ⓑ , the opposite direction is correct. (The direction varies depending on the model.)
The waveform of 4cm produced by turning the tracking control knob is called the "2/3 waveform". The following are all performed using the 2/3 waveform unless otherwise indicated.

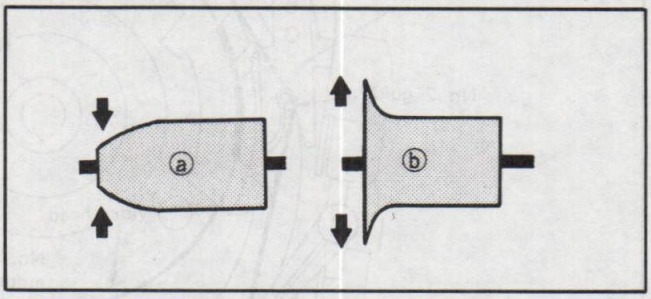


Fig. 3-7

Note 1): Correct tape path adjustment cannot be done without this 2/3 waveform. Be sure to adjust using this waveform.
2): The adjustment guides have screw lock applied to secure them, so remove the screw lock with alcohol first.

3-3. Entrance Side Adjustment

The adjustment locations are No. 3, 4, 5 and 6 guides. No. 3 guide is for lateral adjustment, No. 4 guide for lower flange tape pressure adjustment, No. 5 for lateral and upper flange tape pressure adjustment, and No. 6 guide is for upper flange tape pressure adjustment.

Adjustment Procedure:

1) Turn No. 6 guide upper flange counterclockwise and make a space between the upper flange and the tape. (Fig. 3-8, more than 0.5mm)

www.freeservicemanuals.info

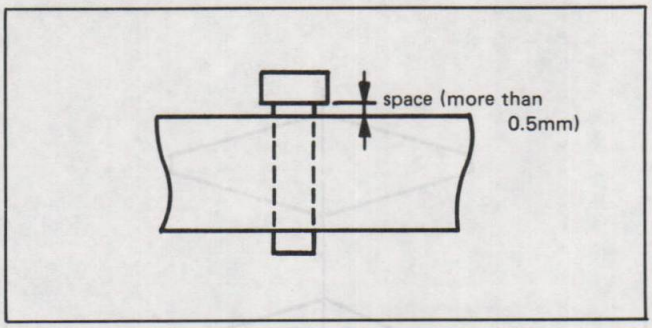


Fig. 3-8

2) Turn No. 4 guide fully clockwise until it touches.
3) Turn No. 4 guide 360° counterclockwise from the position in 2).
4) Turn No. 5 guide lateral screw (Fig. 3-9) counterclockwise and make slack at the upper portion of the tape. (Fig. 3-10) Next turn the screw clockwise and fix at the position where slack disappears. (Fig. 3-11)

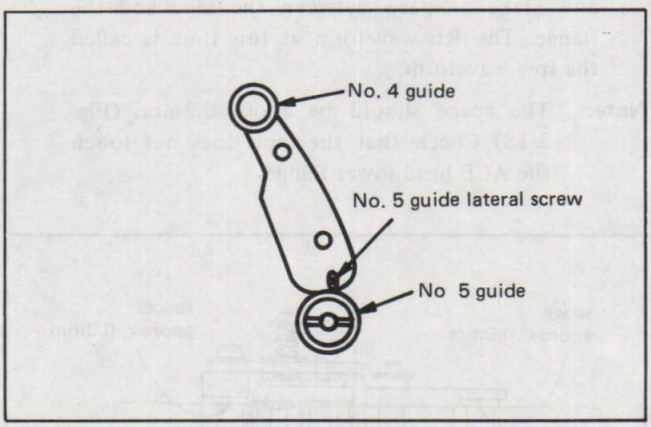


Fig. 3-9

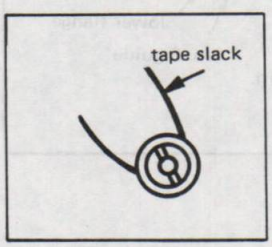


Fig. 3-10

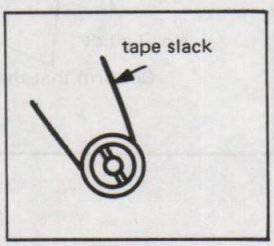


Fig. 3-11

Note: Tape slack: When the tape winds around the guides when running, if the guide slants, the tension at the upper and lower portions of the tape differs, and the portion with less tension develops tape slack.

5) Adjust No. 3 guide slant so that the slack of the tape winding around No. 4 guide is the same at the top and bottom. When the upper slack of the tape near No. 4 guide is larger, loosen the screw in Fig. 3-12 and move the No. 3 adjust plate in the direction of arrow (a). When the bottom slack is larger, move it in the direction of arrow (b). Then tighten the adjustment screw.

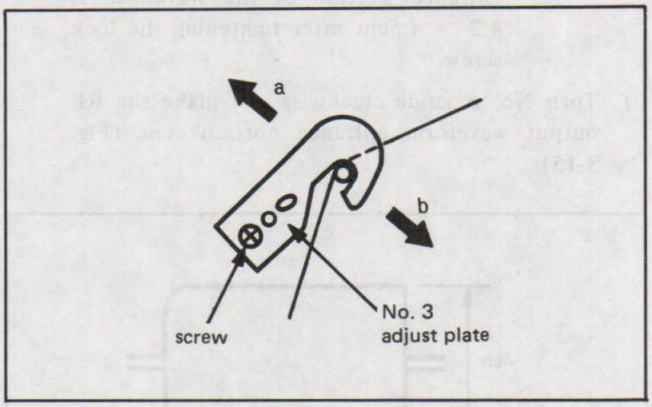


Fig. 3-12

6) Turn No. 5 guide lock screw counterclockwise to loosen. (Fig. 3-13)

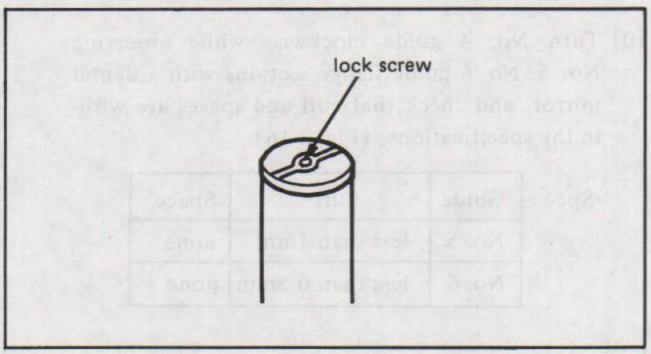


Fig. 3-13

7) Turn No. 5 guide flange so that RF output waveform entrance portion is 4.2 – 4.5cm. (Fig. 3-14)

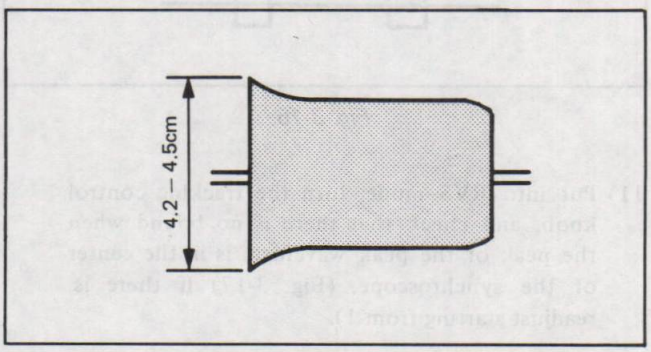


Fig. 3-14

www.freeservicemanuals.info

8) Turn No. 5 guide lock screw clockwise to tighten.

Note: When the lock screw is tightened, the waveform changes easily, so be sure that the waveform is within the specifications after the screw is tightened. (Fig. 3-14) If not, adjust so that the entrance portion of the waveform is 4.2 – 4.5cm after tightening the lock screw.

9) Turn No. 6 guide clockwise and make the RF output waveform entrance portion 4cm. (Fig. 3-15)

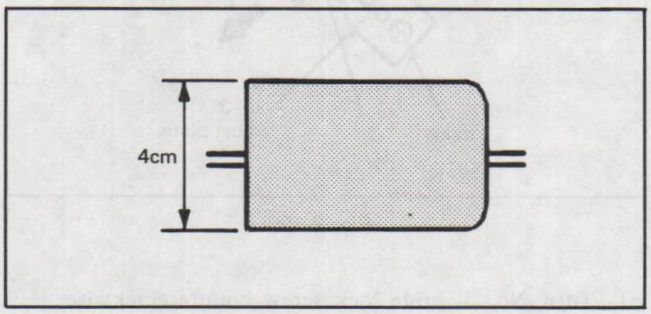


Fig. 3-15

10) Turn No. 4 guide clockwise while observing No. 5, No. 6 guide flange sections with a dental mirror, and check that curl and spaces are within the specifications. (Fig. 3-16)

Spec :

Guide	Curl	Space
No. 5	less than 1mm	none
No. 6	less than 0.5mm	none

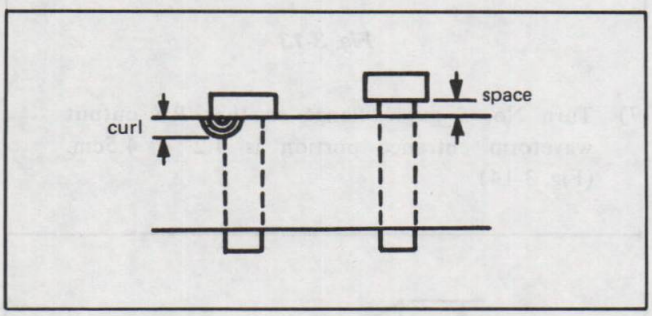


Fig. 3-16

11) Put into RVS mode, turn the tracking control knob, and check that there is no bound when the peak of the peak waveform is in the center of the synchroscope. (Fig. 3-17) If there is, readjust starting from 1).

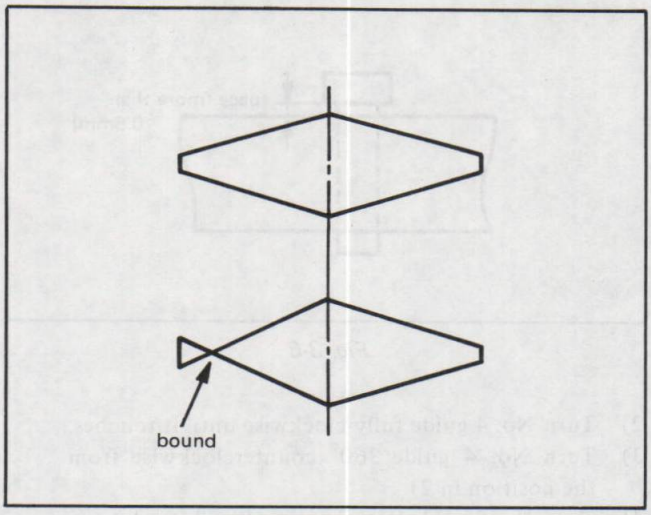


Fig. 3-17 RVS waveform

3-4. Exit Side Adjustment

1) Turn No. 7 and No. 8 guides counterclockwise and make a space between the tape and the flange. The RF waveform at this time is called the free waveform.

Note: The space should be about 0.3mm. (Fig. 3-18) Check that the tape does not touch the ACE head lower flange.

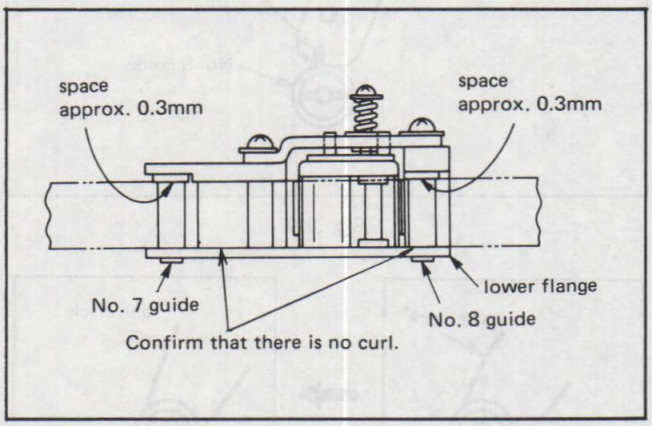


Fig. 3-18

2) Check that the free waveform is within the range shown in Fig. 3-19 ⓐ – ⓑ .

www.freeservicemanuals.info

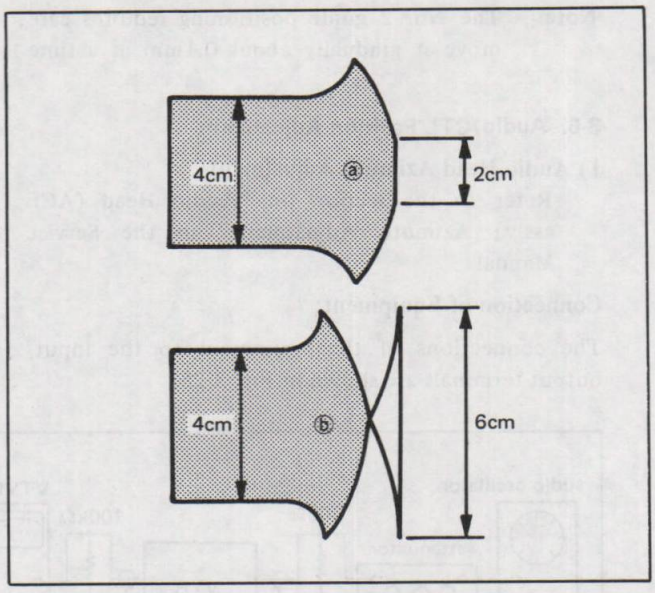


Fig. 3-19 Free Waveform

3) If the free waveform is not within the range in Fig. 3-19, perform the following adjustment.
   (1) When there are no (or few) peaks on the free waveform: Turn height adjustment screw ⓐ (Fig. 3-20) slowly clockwise to obtain the range in Fig. 3-19.
   (2) When there are too many peaks: Turn height adjustment screw ⓐ slowly counterclockwise.

Note 1): Turn screw ⓐ slowly and observe the waveform movement every 30°.
2): When screw ⓐ is turned, the tape running height changes, and the tape may touch the upper or lower guide flange. Therefore, when performing this adjustment, observe continuously with a dental mirror and make sure that the tape does not touch the No. 7, 8 guide flanges and ACE head lower flange. If the tape touches No. 7, 8 guides before the range in Fig. 3-19 is obtained, turn No. 7, 8 guides counterclockwise and make space. If it touches the ACE head lower flange, turn No. 7, 8 guides clockwise.

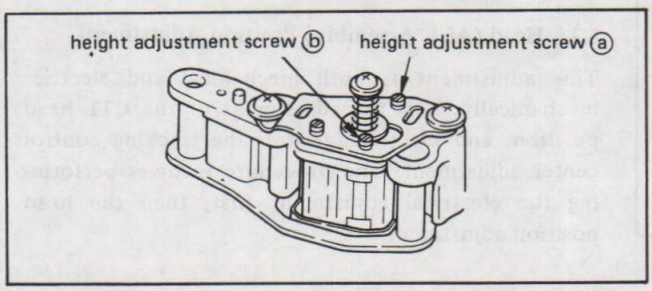


Fig. 3-20

4) Turn No. 7 guide clockwise and make the RF output waveform exit 4cm. (Fig. 3-21)

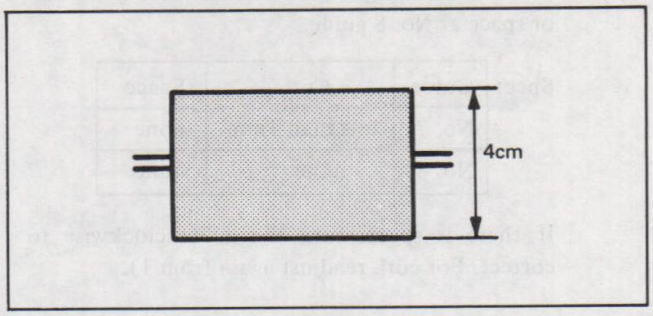


Fig. 3-21 No. 7 Guide Waveform

5) While observing the No. 8 guide and tape space with a dental mirror, turn the No. 8 guide clockwise, and get rid of the space. (This can be done more easily by turning until a curl appears, then turning in the opposite direction just until the curl is gone.)
6) Check that the RF output waveform exit portion is 4cm. If it has changed, make it 4cm with No. 7 guide. If No. 8 guide is tightened, the RF waveform changes and goes over 4cm, so turn No. 7 guide again and make it 4cm.
7) Check again that there is no space between No. 8 guide and the tape.
8) Loosen No. 9 guide lock screw. (Fig. 3-22)

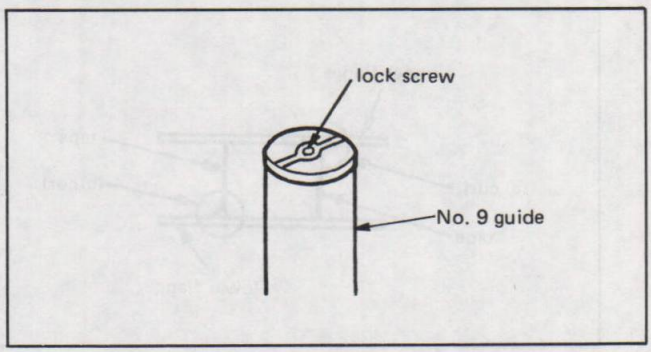


Fig. 3-22

9) Put into RVS mode and check No. 8 guide curl and space with a dental mirror.
10) When there is curl at No. 8 guide in RVS mode, turn No. 9 guide clockwise and adjust so that the curl disappears. When there is space, turn the No. 9 guide counterclockwise and adjust so that space is gone.
11) Check that there is no curl at No. 8 guide in REV mode.
12) If there is curl at No. 8 guide in REV mode, turn No. 9 guide clockwise to get rid of the curl. If put into RVS mode at this time, there will be space, but this is OK.

www.freeservicemanuals.info

13) When there is no more curl or space at No. 8 guide, tighten No. 9 guide lock screw.
14) In RVS mode again, check that there is no curl or space at No. 8 guide.

Spec:

Guide	Curl	Space
No. 7	less than 1mm	none
No. 8	none	none

If there is space, turn the guide clockwise to correct. For curl, readjust again from 1).

3-5. S Reel Damage Check

1) Play back the tape and portion of L-830 tape in RVS mode (or REV mode for models without RVS mode), and check that there is no tape curl at the S reel flange.
2) For curl at the S reel upper flange:
(Fig. 3-23 ⓐ) Loosen the No. 2 adjust plate screw, move the plate in the direction of arrow ⓐ in Fig. 3-24 and tighten the screw.
For tape curl at the lower flange:
(Fig. 3-23 ⓑ) Loosen the No. 2 adjust plate screw, move the plate in the direction of arrow ⓑ in Fig. 3-24 and tighten the screw.
Perform S reel damage check again and repeat until there is no tape curl (tape damage) at the upper and lower flanges.

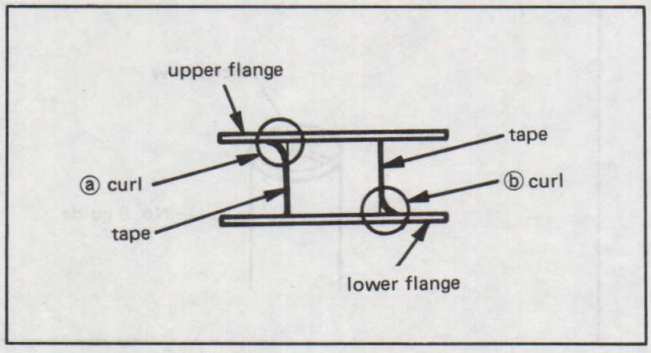


Fig. 3-23 S Reel

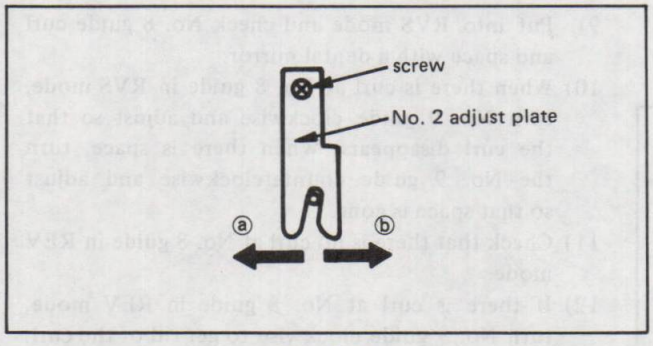


Fig. 3-24

Note: The No. 2 guide positioning requires care; move it gradually about 0.1mm at a time.

3-6. Audio/CTL Position Adjustment

1) Audio Head Azimuth Adjustment

Refer to the section on "Audio Head (ACE ass'y) Azimuth Adjustment" in the Service Manual.

Connection of Equipment:

The connections of the equipment to the input/output terminals are shown in Fig. 3-25.

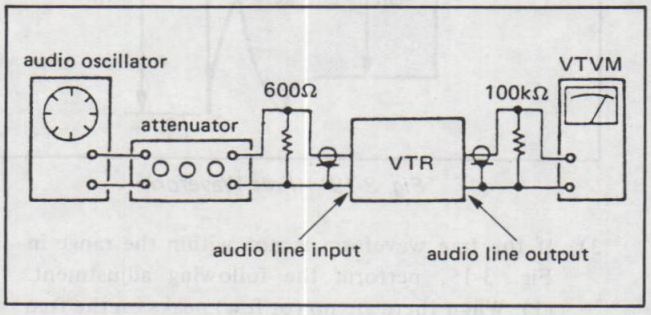


Fig. 3-25 Connections

(1) Terminate the audio line output terminal with a 100kΩ resistor and connect a VTVM.
(2) Play back the 5kHz signal segment of the alignment tape (KR5-1M).
(3) Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 3-25)

Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

2) CTL Position Adjustment

Adjust ACE head position so that the RF output waveform is maximum when the tracking control knob is at center click.
Refer to the section on "ACE Assembly Position Adjustment" in the Service Manual.

Note: Be sure to perform with tracking control knob at center click.

CTL Head (ACE Assembly) Position Adjustment

This adjustment is both mechanical and electric: mechanically, it is the adjustment of the CTL head position, and electrically, it is the tracking control center adjustment. The procedure involves performing the electrical adjustment first, then the head position adjustment.

www.freeservicemanuals.info

(1) Connect the oscilloscope as follows:
1ch. . . . . .RF out
2ch. . . . . .AUDIO out
external trigger . . . . . SWITCHING PULSE out
(2) Replay the tracking portion of the alignment tape (KR5-1M).
(3) Turn the tracking control knob back and forth, and confirm that the output waveform level is maximum at the center click position, and that the 0 level of the audio signal is at the point where the RF output waveform Bch waveform appears, as shown in Fig. 3-26. If adjustment is necessary, proceed as follows.

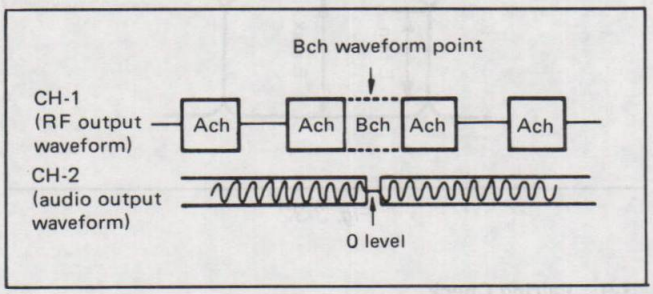


Fig. 3-26

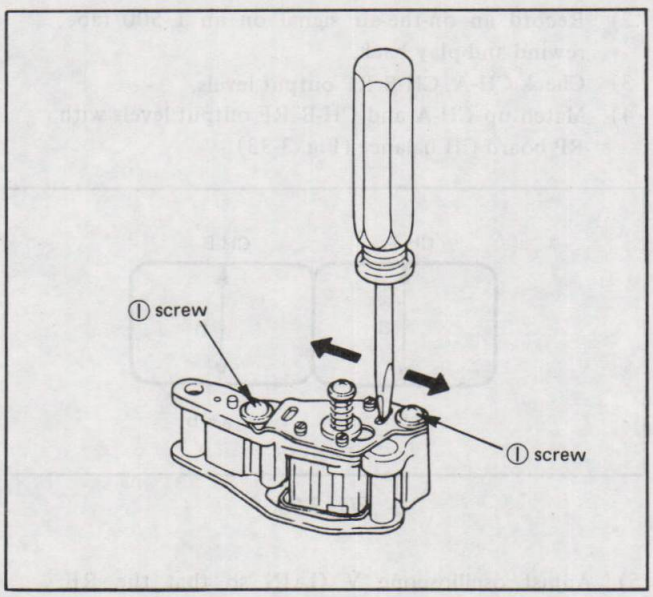


Fig. 3-27

(4) Tracking Control Center Adjustment
(5) CTL Head Position Adjustment
Set the tracking control knob at the center click position and loosen the two ACE assembly position adjustment screws ①. As shown in Fig. 3-27, slide the ACE assembly with a screwdriver until it is in the position shown in Fig. 3-26 and the RF output waveform is maximum. Tighten the screws when this position is obtained.
(6) Replay the color bars of the alignment tape and check the picture quality.

3-7. Audio Height Adjustment

This adjustment is basically unnecessary, as it is preadjusted at the factory. The same applies to the repair ACE assembly. However, if the adjustment screw has been touched and it is absolutely necessary to adjust, perform the following procedure.

Parallel Adjustment Relative to ACE Head Guide

1) Place the parallel plate SL-0657 on No. 5 guide and audio/CTL head. (Fig. 3-28)

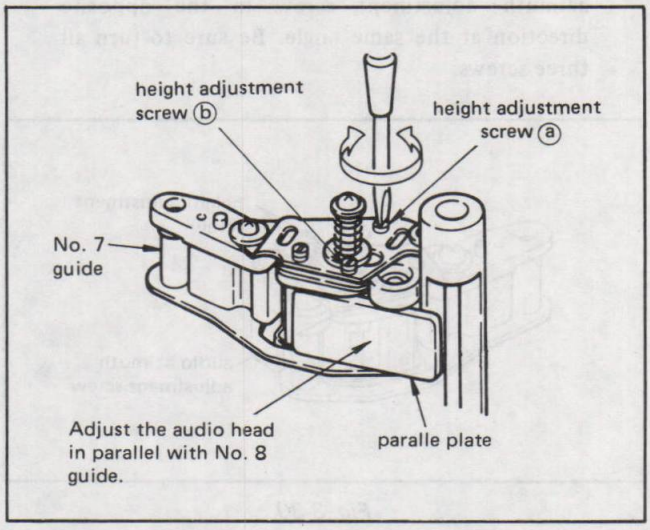

height adjustment screw ⓑ
height adjustment screw ⓐ
No. 7 guide
Adjust the audio head in parallel with No. 8 guide.
paralle plate

Fig. 3-28

2) With No. 5 guide as reference, confirm that there is no space between the audio/CTL head and the parallel plate.
If there is space at the top (Fig. 3-29 ①), adjust by turning the height adjustment screw ⓐ counterclockwise. (Fig. 3-28)
If there is space at the bottom (Fig. 3-29 ②), adjust by turning the height adjustment screw ⓐ clockwise.
(Judge if there is space by pressing the parallel plate with a finger to see if there is play.)

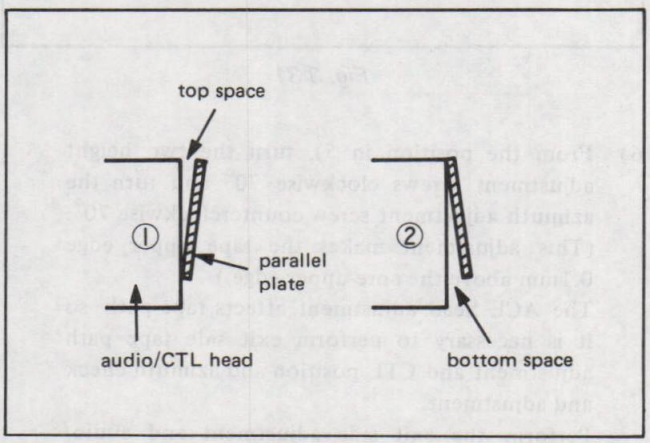


Fig. 3-29

www.freeservicemanuals.info

3) Put KR5-1M into FWD.
4) Perform azimuth adjustment according to the Service Manual.
5) While observing the audio head (Fig. 3-30) with a dental mirror, match up the core upper edge and tape upper edge as in Fig. 3-31, with the two height adjustment screws and the azimuth adjustment screw.
   Turn the two height adjustment screws in the same direction at the same angle, and the azimuth adjustment screw in the opposite direction at the same angle. Be sure to turn all three screws.

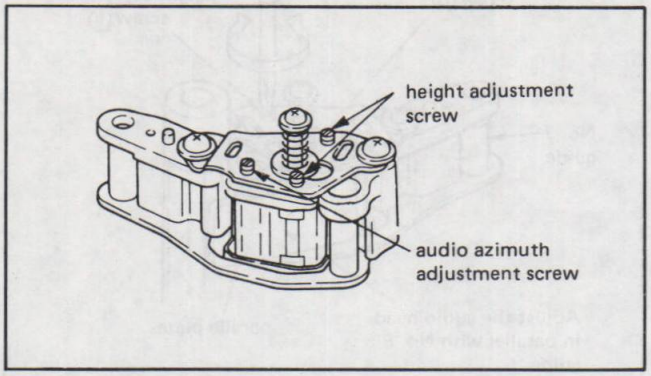


Fig. 3-30

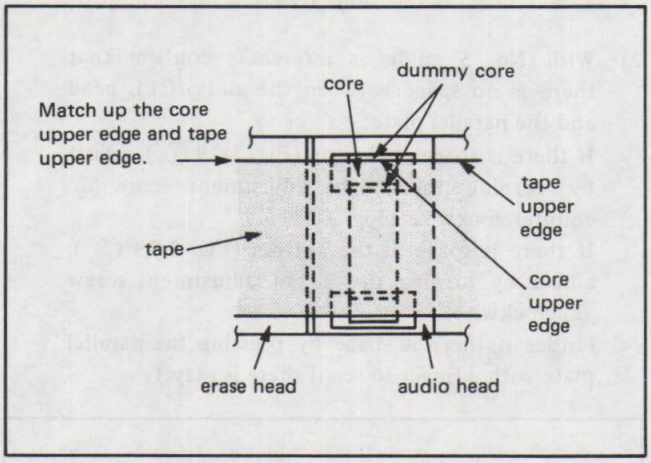


Fig. 3-31

6) From the position in 5), turn the two height adjustment screws clockwise 70° and turn the azimuth adjustment screw counterclockwise 70°. (This adjustment makes the tape upper edge 0.1mm above the core upper edge.)
   The ACE head adjustment affects tape path, so it is necessary to perform exit side tape path adjustment and CTL position and azimuth check and adjustment.
   Perform the exit side adjustment and audio/CTL position adjustment in the previous sections.

3-8. Self-Recorded RF Output Waveform Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Confirm that the RF output waveform satisfies the conditions in Fig. 3-32. If not, readjust tape path.

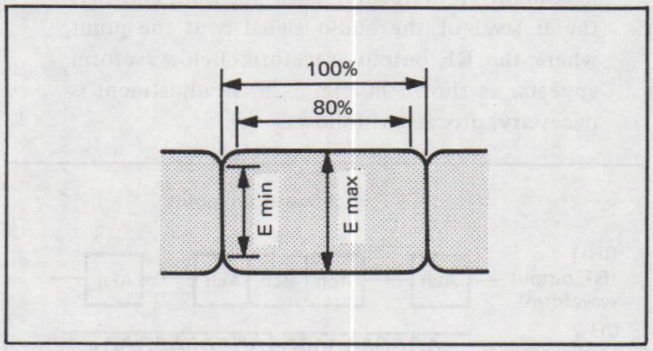


Fig. 3-32

3-9. Pairing Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Check CH-A, CH-B RF output levels.
4) Match up CH-A and CH-B RF output levels with RP board CH balance (Fig. 3-33)

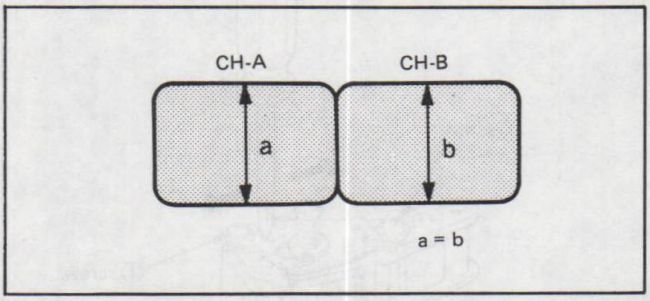


Fig. 3-33

5) Adjust oscilloscope V GAIN so that the RF output waveform on the oscilloscope is 5cm.
6) Turn the tracking control knob to the right, as seen from the front, and make the large output waveform 2cm. (Fig. 3-34)

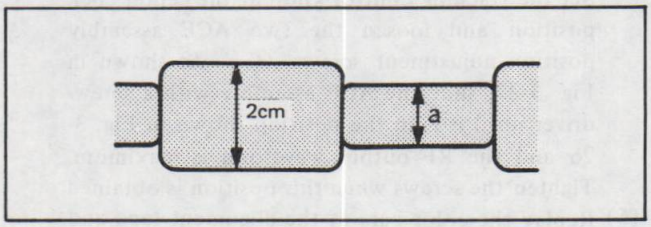
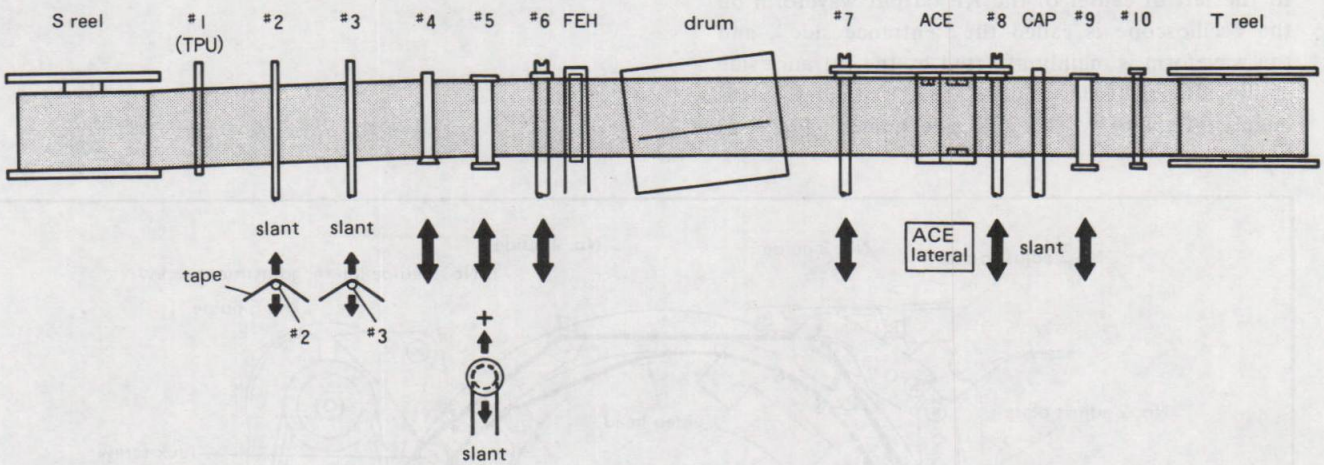


Fig. 3-34

www.freeservicemanuals.info

7) At this time, check that the small output channel's output satisfies the specification. Specification: small output CH 1.0 – 2.0cm (Fig. 3-34 ⓐ)
8) Return oscilloscope V GAIN to its original state, and return RF output level to the state in 3) with CH balance.

3-10. Tape Running Development Chart



The arrows show the directions of the movement.

Fig. 3-35

www.freeservicemanuals.info

SECTION 4

711 TYPE (CCIR SYSTEM)

This adjustment is performed so that the tape runs correctly in a set position, and has a large effect on picture quality and interchangeability. Perform the adjustment in the order given below.

4-1. Terminology

The No. 0 to 6 guides on the tape guide location diagram (Fig. 4-1) are called the entrance side guides, and No. 7 to 10 guides are the exit side guides. When the alignment tape (KR5-2H) is played, the side to the left of center of the RF output waveform on the oscilloscope is called the "entrance side", and the waveform is mainly affected by the entrance side guides. The right side is called the "exit side" and is mainly affected by the exit side guides. (Fig. 4-2)

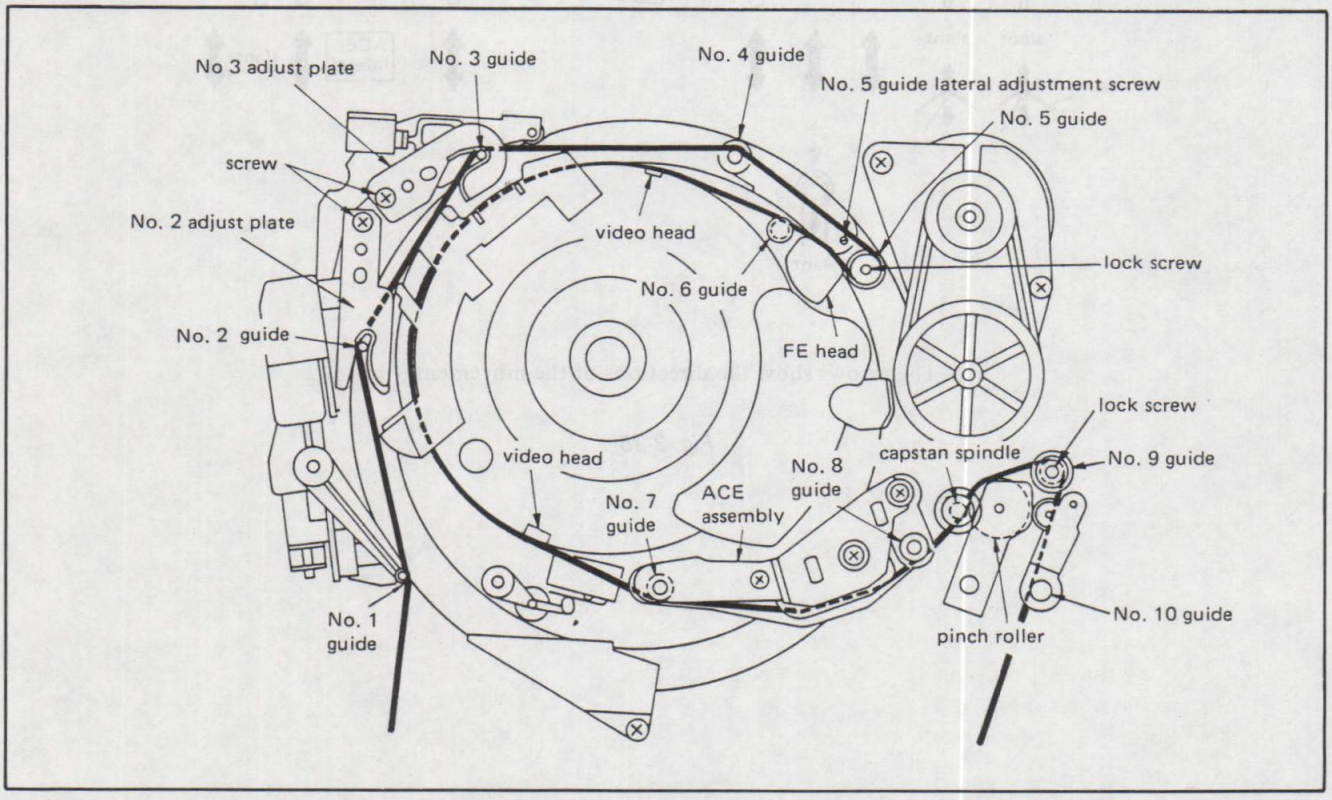


Fig. 4-1 Tape Guide Location Diagram

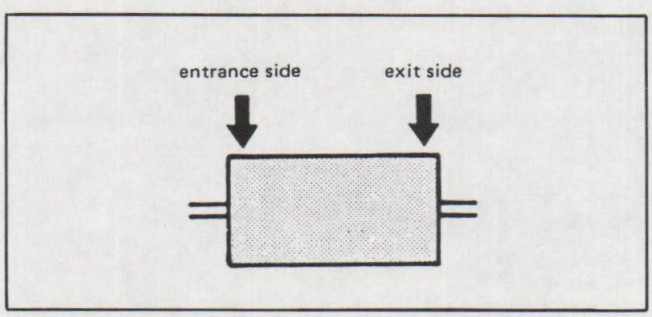


Fig. 4-2 RF Output Waveform

4-2. Preparations for Adjustment

1) Clean the tape running surfaces (tape guides, drum, capstan, pinch roller, ACE head, etc.) with a cleaning cloth dipped in methanol.
2) Remove the cassette lid of the alignment tape (KR5-2H) according to the instructions in the Service Manual.
3) Connect the oscilloscope to RF board RF output pin and the external trigger to the switching pulse pin.

www.freeservicemanuals.info

4) Play back the tracking portion of the alignment tape (KR5-2H).
5) Turn the tracking control knob to the position where the oscilloscope RF output waveform center portion is maximum.
6) Adjust oscilloscope V GAIN so that the RF output waveform center portion is 6cm on the oscilloscope. (Fig. 4-3)

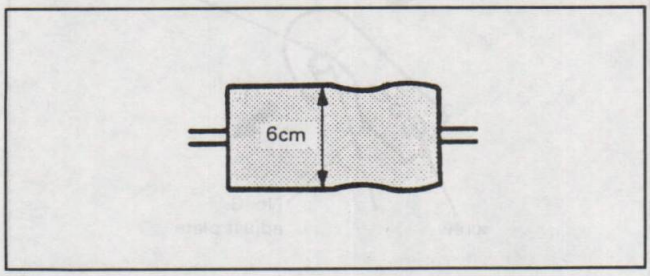


Fig. 4-3

7) Return the tracking control knob to center click and confirm that the RF output waveform is more than 5cm. (Fig. 4-4) When it is less than 5cm, refer to the section on CTL position adjustment and perform coarse adjustment.

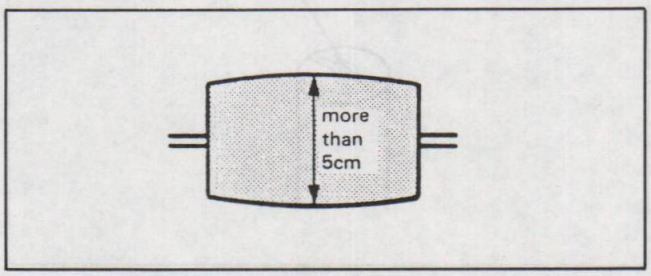


Fig. 4-4 Center Click Waveform

8) Adjust the tracking control knob so that the center of the RF output waveform is 4cm on the oscilloscope. (Fig. 4-5) Check the turning direction of the knob as explained below.

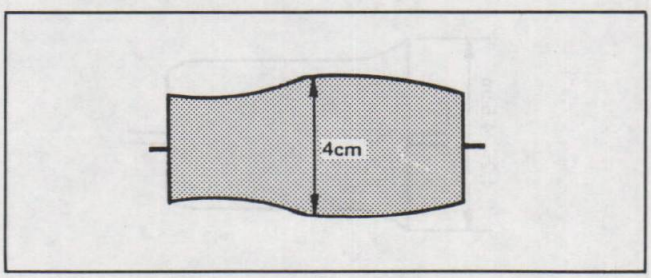


Fig. 4-5

(1) Turn the knob in either the clockwise or counterclockwise direction to make the waveform 4cm. (Fig. 4-6)

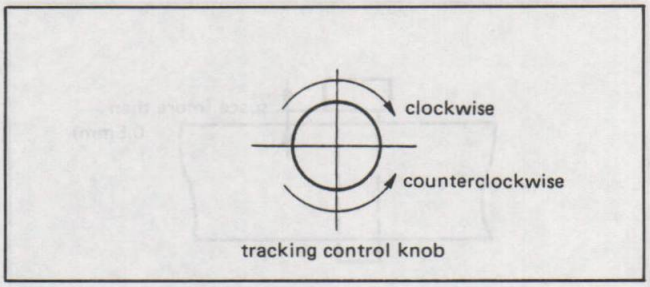


Fig. 4-6 Counterclockwise

(2) Turn the No. 6 guide clockwise.
(3) If the entrance portion of the waveform is as shown in Fig. 4-7 ⓐ and output is small, the direction that the tracking control knob is turned is correct.
If output is large as in Fig. 4-7 ⓑ , the opposite direction is correct. (The direction varies depending on the model.)
The waveform of 4cm produced by turning the tracking control knob is called the "2/3 waveform". The following are all performed using the 2/3 waveform unless otherwise indicated.

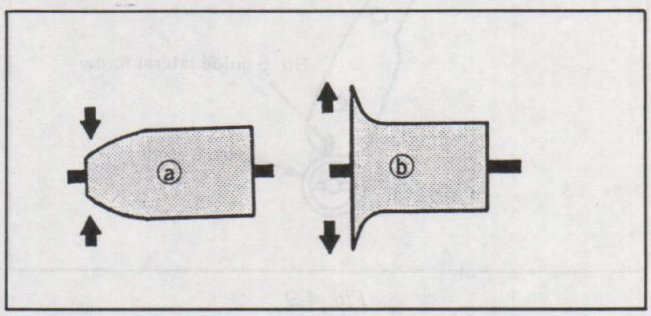


Fig. 4-7

Note 1): Correct tape path adjustment cannot be done without this 2/3 waveform. Be sure to adjust using this waveform.
2): The adjustment guides have screw lock applied to secure them, so remove the screw lock with alcohol first.

4-3. Entrance Side Adjustment

The adjustment locations are No. 3, 4, 5 and 6 guides. No. 3 guide is for lateral adjustment, No. 4 guide for lower flange tape pressure adjustment, No. 5 for lateral and upper flange tape pressure adjustment, and No. 6 guide is for upper flange tape pressure adjustment.

Adjustment Procedure:

1) Turn No. 6 guide upper flange counterclockwise and make a space between the upper flange and the tape. (Fig. 4-8, more than 0.5mm)

www.freeservicemanuals.info

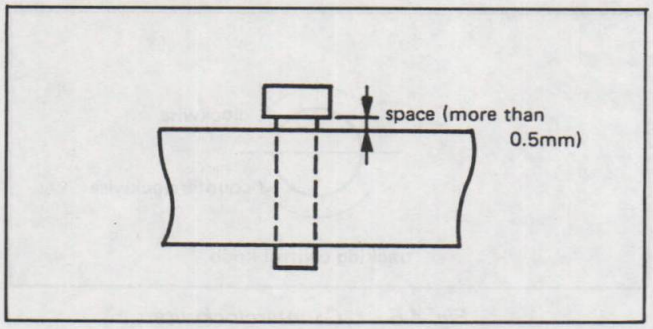


Fig. 4-8

2) Turn No. 4 guide fully clockwise until it touches.
3) Turn No. 4 guide 360° counterclockwise from the position in 2).
4) Turn No. 5 guide lateral screw (Fig. 4-9) counterclockwise and make slack at the upper portion of the tape. (Fig. 4-10) Next turn the screw clockwise and fix at the position where slack disappears. (Fig. 4-11)

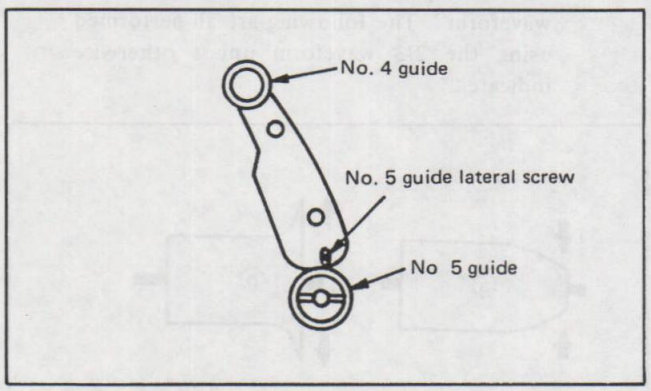


Fig. 4-9

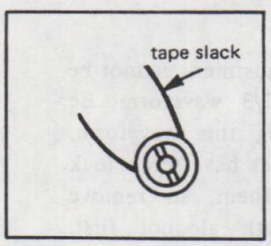


Fig. 4-10

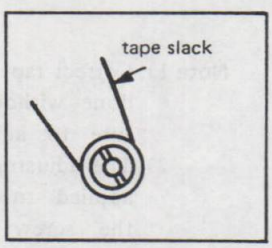


Fig. 4-11

Note: Tape slack: When the tape winds around the guides when running, if the guide slants, the tension at the upper and lower portions of the tape differs, and the portion with less tension develops tape slack.

5) Adjust No. 3 guide slant so that the slack of the tape winding around No. 4 guide is the same at the top and bottom. When the upper slack of the tape near No. 4 guide is larger, loosen the screw in Fig. 4-12 and move the No. 3 adjust plate in the direction of arrow (a). When the bottom slack is larger, move it in the direction of arrow (b). Then tighten the adjustment screw.

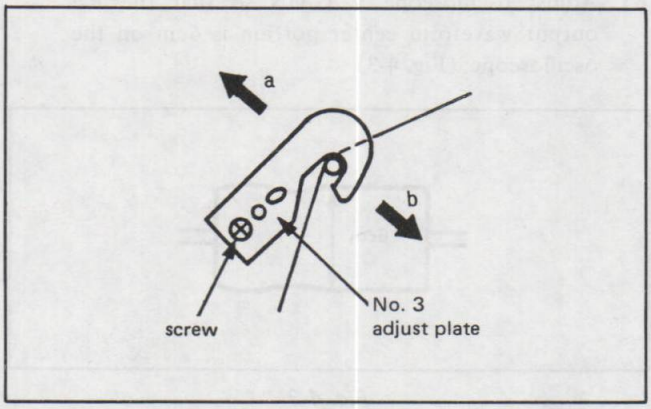


Fig. 4-12

6) Turn No. 5 guide lock screw counterclockwise to loosen. (Fig. 4-13)

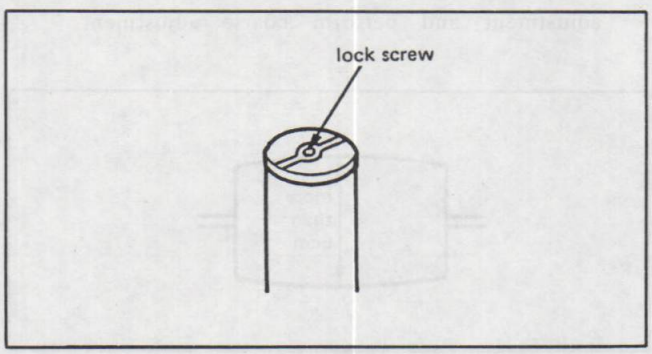


Fig. 4-13

7) Turn No. 5 guide flange so that RF output waveform entrance portion is 4.2 – 4.5cm. (Fig. 4-14)

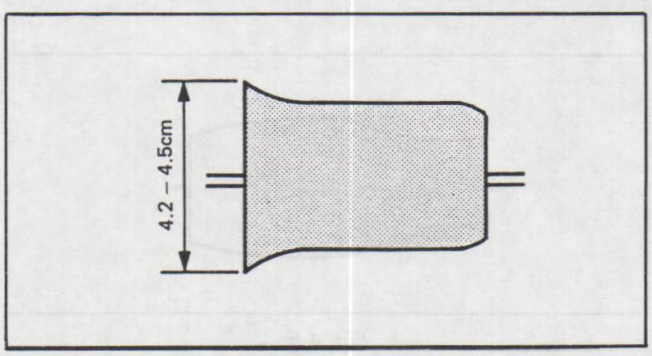


Fig. 4-14

www.freeservicemanuals.info

8) Turn No. 5 guide lock screw clockwise to tighten.

Note: When the lock screw is tightened, the waveform changes easily, so be sure that the waveform is within the specifications after the screw is tightened. (Fig. 4-14) If not, adjust so that the entrance portion of the waveform is 4.2 – 4.5cm after tightening the lock screw.

9) Turn No. 6 guide clockwise and make the RF output waveform entrance porition 4cm. (Fig. 4-15)

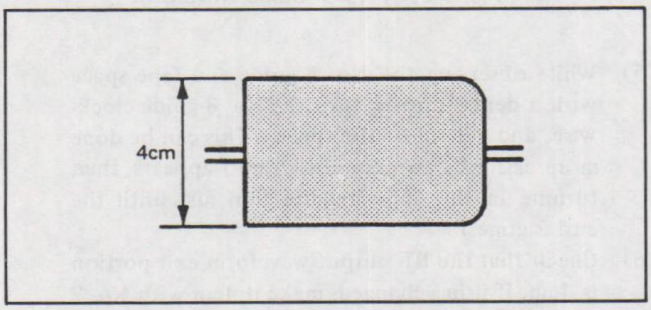


Fig. 4-15

10) Turn No. 4 guide clockwise while observing No. 5, No. 6 guide flange sections with a dental mirror, and check that curl and spaces are within the specifications. (Fig. 4-16)

Spec:

Guide	Curl	Space
No. 5	less than 1mm	none
No. 6	less than 0.5mm	none

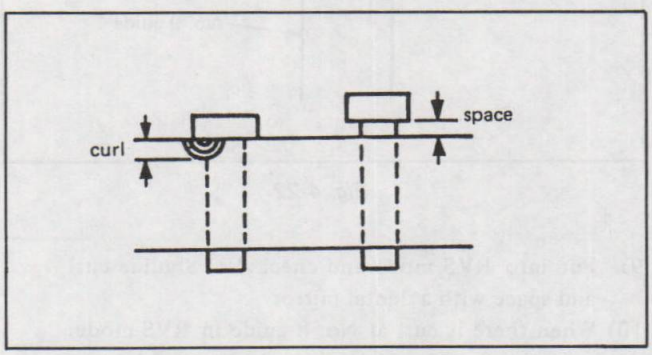


Fig. 4-16

11) Put into RVS mode, turn the tracking control knob, and check that there is no bound when the peak of the peak waveform is in the center of the synchroscope. (Fig. 4-17) If there is, readjust starting from 1).

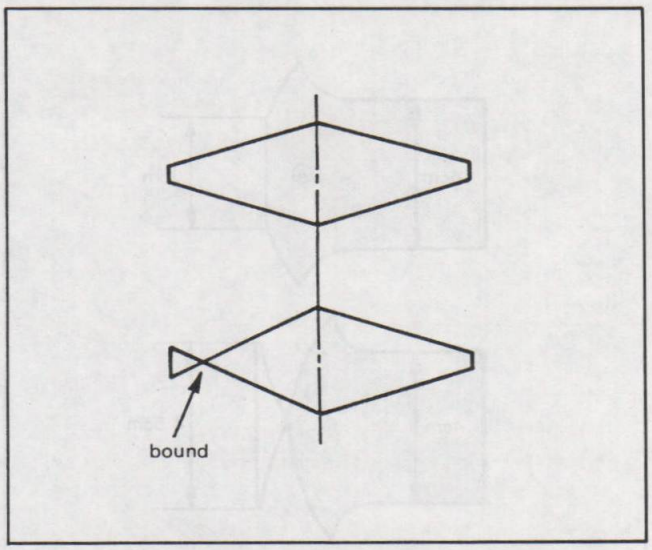


Fig. 4-17 RVS Waveform

4-4. Exit Side Adjustment

1) Turn No. 7 and No. 8 guides counterclockwise and make a space between the tape and the flange. The RF waveform at this time is called the free waveform.

Note: The space should be about 0.3mm. (Fig. 4-18) Check that the tape does not touch the ACE head lower flange.

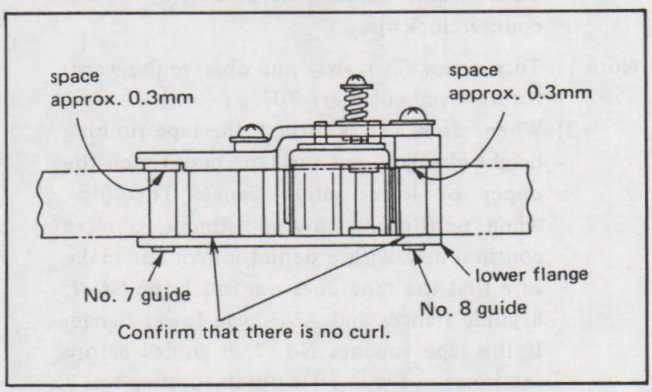


Fig. 4-18

2) Check that the free waveform is within the range shown in Fig. 4-19 ⓐ – ⓑ .

www.freeservicemanuals.info

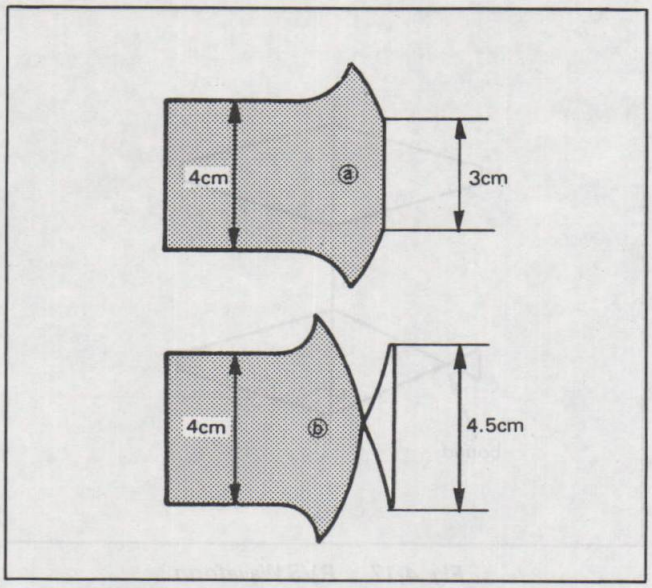


Fig. 4-19 Free Waveform

3) If the free waveform is not within the range in Fig. 4-19, perform the following adjustment.
   (1) When there are no (or few) peaks on the free waveform:
   Turn height adjustment screw ⓐ (Fig. 4-20) slowly clockwise to obtain the range in Fig. 4-19.
   (2) When there are too many peaks:
   Turn height adjustment screw ⓐ slowly counterclockwise.

Note 1): Turn screw ⓐ slowly and observe the waveform movement every 30°.
2): When screw ⓐ is turned, the tape running height changes, and the tape may touch the upper or lower guide flange. Therefore, when performing this adjustment, observe continuously with a dental mirror and make sure that the tape does not touch the No. 7, 8 guide flanges and ACE head lower flange. If the tape touches No. 7, 8 guides before the range in Fig. 4-19 is obtained, turn No. 7, 8 guides counterclockwise and make space. If it touches the ACE head lower flange, turn No. 7, 8 guides clockwise.

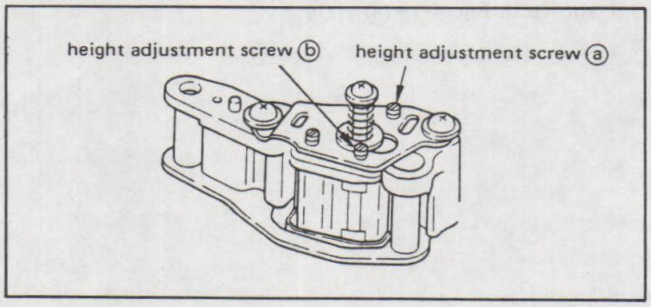


Fig. 4-20

4) Turn No. 7 guide clockwise and make the RF output waveform exit 4cm. (Fig. 4-21)

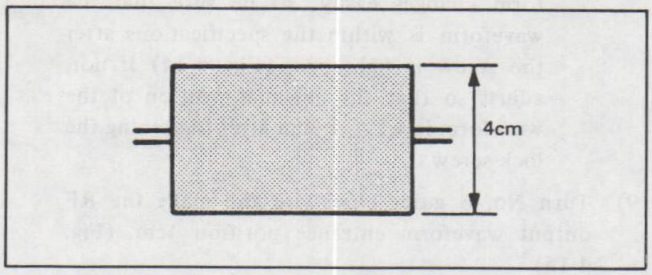


Fig. 4-21 No. 7 Guide Waveform

5) While observing the No. 8 guide and tape space with a dental mirror, turn the No. 8 guide clockwise, and get rid of the space. (This can be done more easily by turning until a curl appears, then turning in the opposite direction just until the curl is gone.)
6) Check that the RF output waveform exit portion is 4cm. If it has changed, make it 4cm with No. 7 guide. If No. 8 guide is tightened, the RF waveform changes and goes over 4cm, so turn No. 7 guide again and make it 4cm.
7) Check again that there is no space between No. 8 guide and the tape.
8) Loosen No. 9 guide lock screw. (Fig. 4-22)

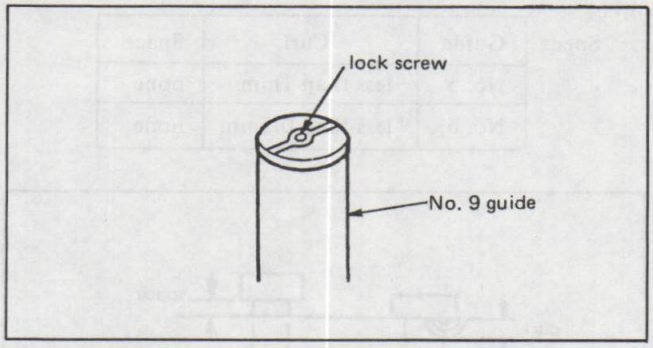


Fig. 4-22

9) Put into RVS mode and check No. 8 guide curl and space with a dental mirror.
10) When there is curl at No. 8 guide in RVS mode, turn No. 9 guide clockwise and adjust so that the curl disappears. When there is space, turn the No. 9 guide counterclockwise and adjust so that space is gone.
11) Check that there is no curl at No. 8 guide in REV mode.
12) If there is curl at No. 8 guide in REV mode, turn No. 9 guide clockwise to get rid of the curl. If put into RVS mode at this time, there will be space, but this is OK.

www.freeservicemanuals.info

13) When there is no more curl or space at No. 8 guide, tighten No. 9 guide lock screw.
14) In RVS mode again, check that there is no curl or space at No. 8 guide.

Spec:

Guide	Curl	Space
No. 7	less than 1mm	none
No. 8	none	none

If there is space, turn the guide clockwise to correct. For curl, readjust again from 1).

4-5. S Reel Damage Check

1) Play back the tape end portion of L-830 tape in RVS mode (or REV mode for models without RVS mode), and check that there is no tape curl at the S reel flange.
2) For curl at the S reel upper flange:
(Fig. 4-23 ⓐ) Loosen the No. 2 adjust plate screw, move the plate in the direction of arrow ⓐ in Fig. 4-24 and tighten the screw.
For tape curl at the lower flange:
(Fig. 4-23 ⓑ) Loosen the No. 2 adjust plate screw, move the plate in the direction of arrow ⓑ in Fig. 4-24 and tighten the screw.
Perform S reel damage check again and repeat until there is no tape curl (tape damage) at the upper and lower flanges.

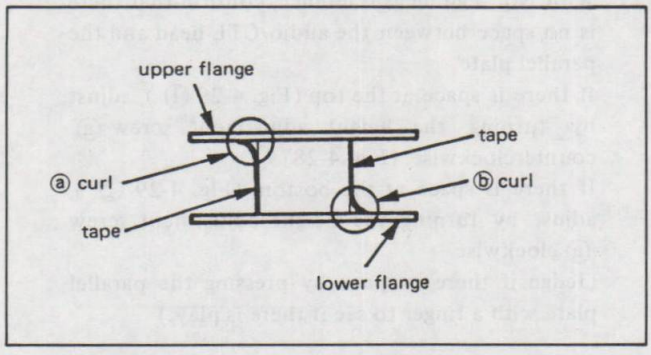


Fig. 4-23 S Reel

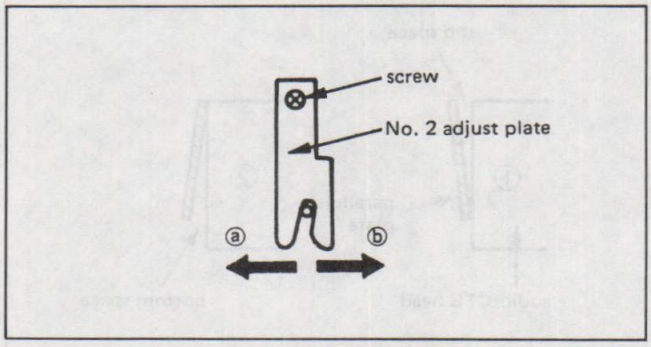


Fig. 4-24

Note: The No. 2 guide positioning requires care; move it gradually about 0.1mm at a time.

4-6. Audio/CTL Position Adjustment

1) Audio Head Azimuth Adjustment

Refer to the section on "Audio Head (ACE ass'y) Azimuth Adjustment" in the Service Manual.

Connection of Equipment:

The connections of the equipment to the input/output terminals are shown in Fig. 4-25.

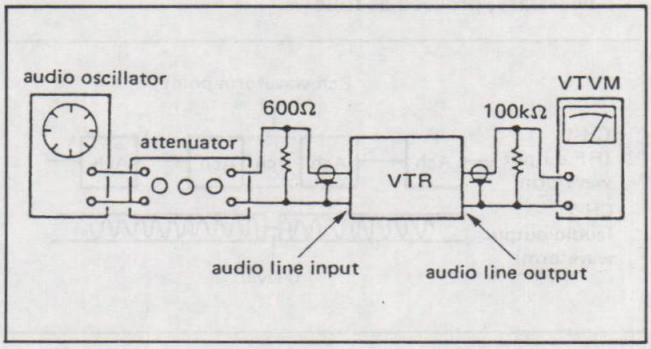


Fig. 4-25 Connections

(1) Terminate the audio line output terminal with a 100kΩ resistor and connect a VTVM.
(2) Play back the 5kHz signal segment of the alignment tape (KR5-2H).
(3) Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 4-25).

Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

2) CTL Position Adjustment

Adjust ACE head position so that the RF output waveform is maximum when the tracking control knob is at center click.
Refer to the section on "ACE Assembly Position Adjustment" in the Service Manaul.

Note: Be sure to perform with tracking control knob at center click.

CTL Head (ACE Assembly) Position Adjustment

This adjustment is both mechanical and electric: mechanically, it is the adjustment of the CTL head position, and electrically, it is the tracking control center adjustment. The procedure involves performing the electrical adjustment first, then the head position adjustment.

www.freeservicemanuals.info

(1) Connect the oscilloscope as follows:
1ch. . . . . .RF out
2ch. . . . . .AUDIO out
external trigger . . . . . SWITCHING PULSE out

(2) Replay the tracking portion of the alignment tape (KR5-2H).

(3) Turn the tracking control knob back and forth, and confirm that the output waveform level is maximum at the center click position, and that the 0 level of the audio signal is at the point where the RF output waveform Bch waveform appears, as shown in Fig. 4-26. If adjustment is necessary, proceed as follows.

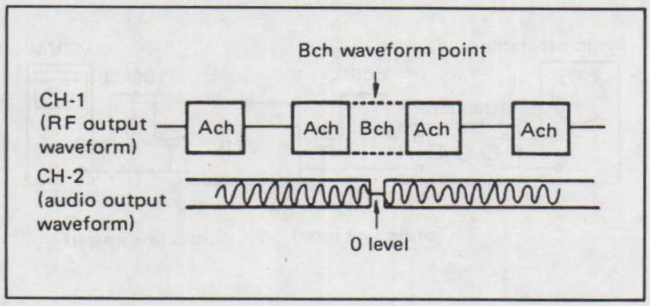


Fig. 4-26

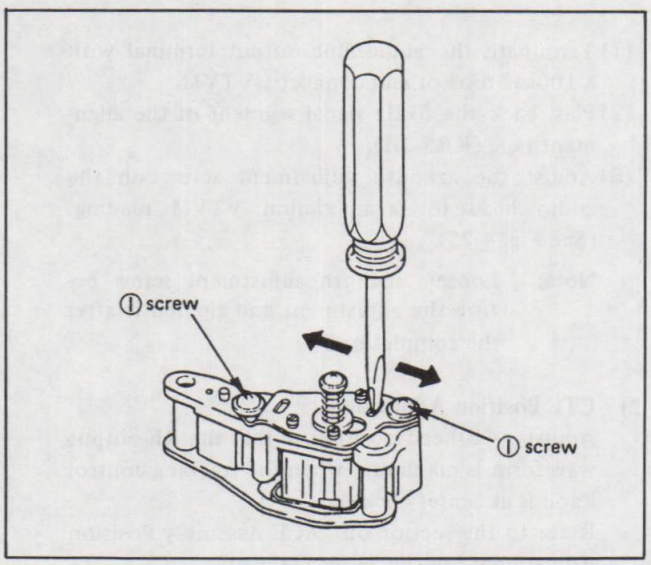


Fig. 4-27

(4) Tracking Control Center Adjustment.

(5) CTL Head Position Adjustment
Set the tracking control knob at the center click position and loosen the two ACE assembly position adjustment screws ① .
As shown in Fig. 4-27, slide the ACE assembly with a screwdriver until it is in the position shown in Fig. 4-26 and the RF output waveform is maximum. Tighten the screws when this position is obtained.

(6) Replay the color bars of the alignment tape and check the picture quality.

4-7. Aduio Height Adjustment

This adjustment is basically unnecessary, as it is pre-adjusted at the factory. The same applies to the repair ACE assembly. However, if the adjustment screw has been touched and it is absolutely necessary to adjust, perform the following procedure.

Parallel Adjustment Relative to ACE Head Guide

1) Place the parallel plate SL-0657 on No. 5 guide and audio/CTL head. (Fig. 4-28)

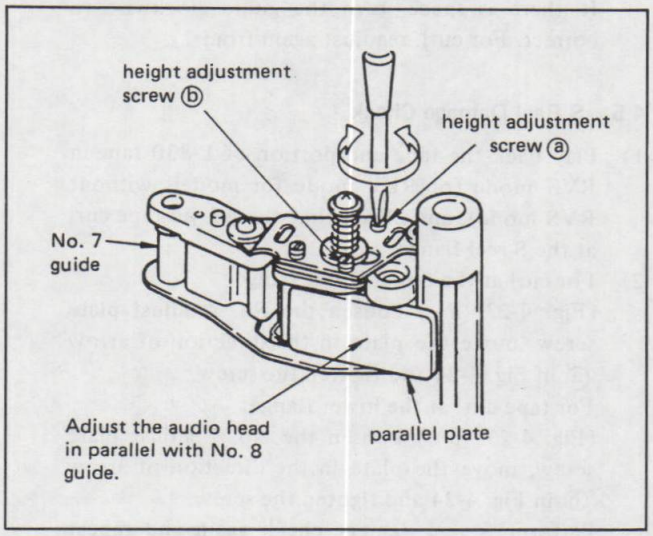


Fig. 4-28

2) With No. 5 guide as reference, confirm that there is no space between the audio/CTL head and the parallel plate.
If there is space at the top (Fig. 4-29 ①), adjust by turning the height adjustment screw ⓐ counterclockwise. (Fig. 4-28)
If there is space at the bottom (Fig. 4-29 ②), adjust by turning the height adjustment screw ⓐ clockwise.
(Jedge if there is space by pressing the parallel plate with a finger to see if there is play.)

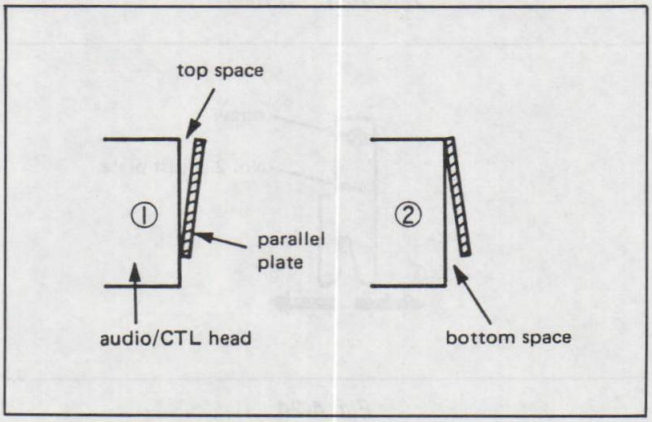


Fig. 4-29

www.freeservicemanuals.info

3) Put KR5-2H into FWD.
4) Perform azimuth adjustment according to the Service Manual.
5) While observing the audio head (Fig. 4-30) with a dental mirror, match up the core upper edge and tape upper edge as in Fig. 4-31, with the two height adjustment screws and the azimuth adjustment screw.
Turn the two height adjustment screws in the same direction at the same angle, and the azimuth adjustment screw in the opposite direction at the same angle. Be sure to turn all three screws.

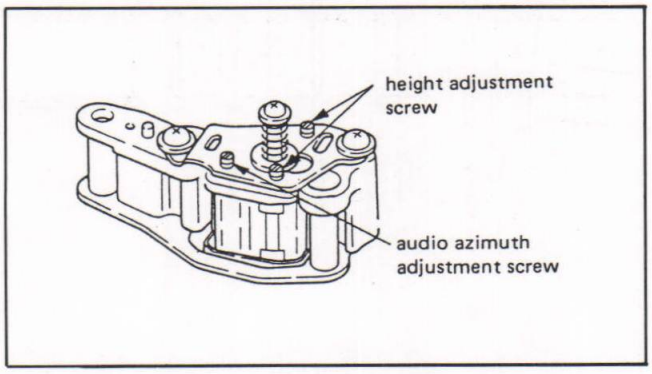


Fig. 4-30

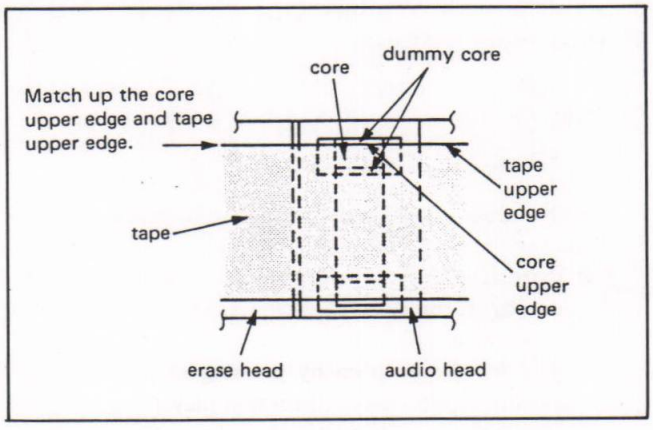


Fig. 4-31

6) From the position in 5), turn the two height adjustment screws clockwise 70° and turn the azimuth adjustment screw counterclockwise 70°. (This adjustment makes the tape upper edge 0.1mm above the core upper edge.)
The ACE head adjustment affects tape path, so it is necessary to perform exit side tape path adjustment and CTL position and azimuth check and adjustment.
Perform the exit side adjustment and audio/CTL position adjustment in the previous sections.

4-8. Self-Recorded RF Output Waveform Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Confirm that the RF output waveform satisfies the conditions in Fig. 4-32. If not, readjust tape path.

① $\frac{E\ min}{E\ max} \geqq 65\%$

② at 80% interval, $\frac{E}{E\ max} \geqq 80\%$

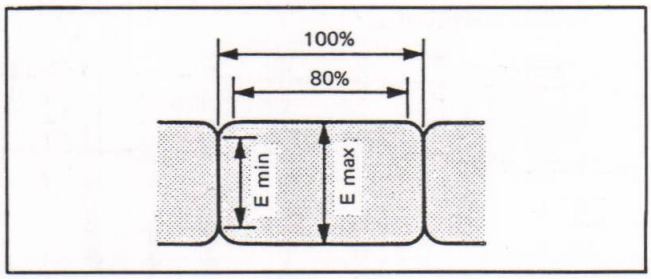


Fig. 4-32

4-9. Pairing Check

1) Set the tracking control knob to center click.
2) Record an on-the-air signal on an L-500 tape, rewind and play back.
3) Check CH-A, CH-B RF output levels.
4) Match up CH-A and CH-B RF output levels with RP board CH balance. (Fig. 4-33)

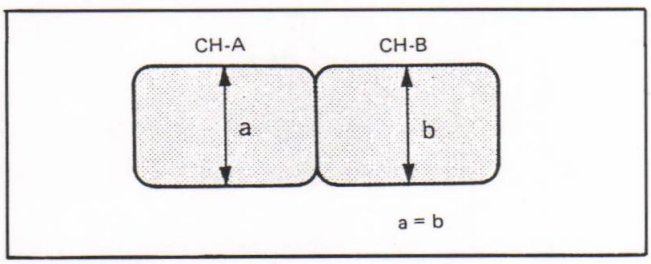


Fig. 4-33

5) Adjust oscilloscope V GAIN so that the RF output waveform on the oscilloscope is 5cm.
6) Turn the tracking control knob to the right, as seen from the front, and make the large output waveform 2cm. (Fig. 4-34)

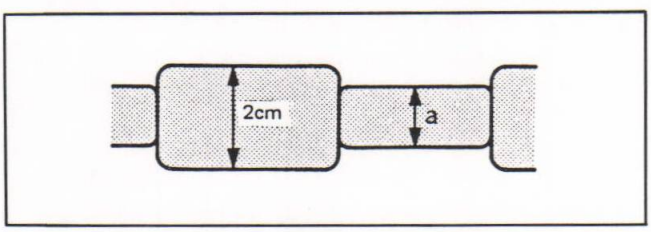
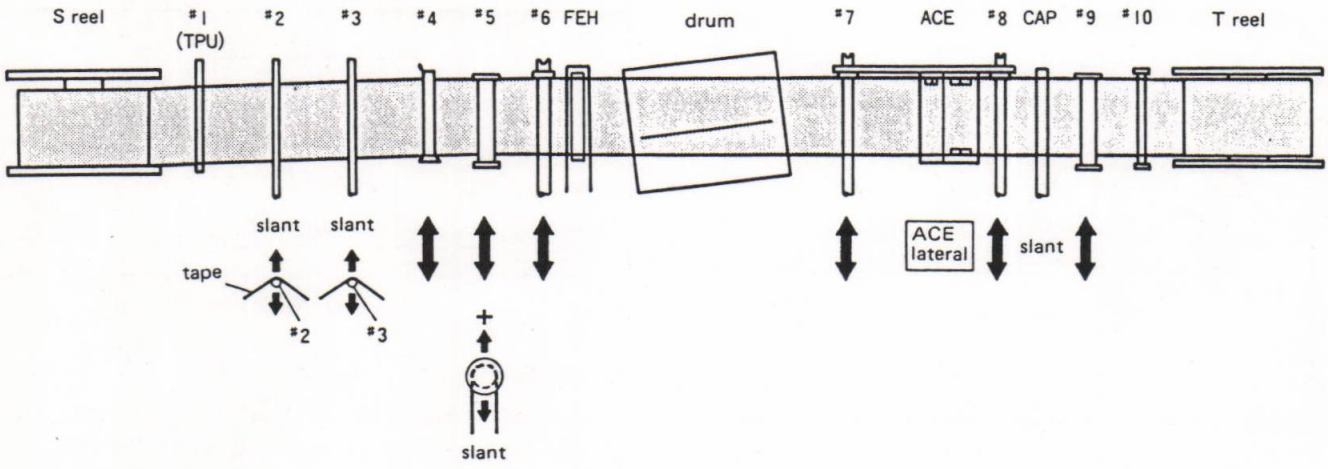


Fig. 4-34

www.freeservicemanuals.info

7) At this time, check that the small output channel's output satisfies the specification. Specification: Small output CH 1.0 – 2.0cm (Fig. 4-34 ⓐ)
8) Return oscilloscope V GAIN to its original state, and return RF output level to the state in 3) with CH balance.

4-10. Tape Running Development Chart



The arrows show the directions of the movement.

Fig. 4-35

© 1984